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Journal of Electricity and Western Industry

May 1, 1921

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ELECTRICITY IN THE NATIONAL PARKS

NOT alone to the industrial, agricultural and commercial West is electricity rendering its service to the people, but in the forest and park reserves of this great empire in the making, where the whole world comes to play, the introduction of the method electrical has made possible greater comforts and conveniences for the thousands of pleasure seekers who come from every quarter of the globe, and in the receptive mood of recreation the vision of electric service is instilled in their minds in a manner not otherwise possible. The Sentinel Hotel in Yosemite Valley is noted especially for its electrical heating installation, whereby it is enabled to keep its doors open throughout the winter. The warmth and good cheer streaming from the lighted windows and the glow of hundreds of electric lamps on the giant spruce tree give to this Christmas celebration in the heart of the mountains the real festive spirit.

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Journal of Electricity and Western Industry

A publication devoted to the upbuilding of the great industrial West and the countries bordering on the Pacific

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Interpreting Western progress through the application of electric power, light, and heat in industry and in the home

Vol. 46, No. 9 SAN FRANCISCO, MAY 1, 1921 Per Copy, 25 Cents

Impressive Statistics on Water Power Uses in West

STATISTICS on the nation's consumption of hydroelectric energy, recently made public by the United States Geological Survey, are most impressive. Long have the eyes of the nation followed the great development at Niagara Falls, the vast interconnected systems that spread down through the Southern States of Georgia, Alabama, Tennessee and the Carolinas, and the other systems over in the Middle West and along the Mississippi, and particularly the giant installation at Keokuk, Iowa. On the other hand, little attention or thought has been given to the mountain fastnesses of the West sloping off toward the Pacific, for even today it is doubtful if through the nation as a whole there prevails any conception whatsoever not only as to the future possibilities of water power in this region, but as to the actual uses of hydroelectric energy already developed in this growing section of the country. The statistics above alluded to will unquestionably create a sensation when it is realized that, in spite of the fact that this section of the country contains only something like nine per cent of the population, yet from the Rockies to the Pacific last year there was consumed almost forty per cent of the entire hydroelectric energy of the nation. These statistics show that the nation as a whole in utility service produced 16.3 billion kilowatt-hours of hydroelectric energy, while in the eleven Western states there were produced 7.96 billion kilowatt-hours, constituting 38.9% of the entire hydroelectric production in the United States of America.

Agriculture, mining, lumber and manufacture in the West are so closely dependent upon the development of western water power—which comprises nearly seventy per cent of the entire undeveloped water power of the nation—that there comes more and more to the consciousness of every thoughtful citizen the realization that as develop the water power resources of the West, so develops the West along every line of civic, commercial, agricultural and industrial activity.

Winning the Public

There is something more than idle words required in these days of stress to convince the public that the utility companies of the nation are giving of their best to serve the people. Expenses are high, living costs seem to be slow in coming down, and the whole world seems rent asunder with dissatisfaction and perplexities. To one who has, however, given thoughtful attention to what the West is contributing in utility service, there comes a deep-seated conviction that the people are being given dollar for dollar in service, that there is a sincere desire to follow the adage, "He profits most who serves best," and that, like other human beings, the men engaged in this great work rightfully pride themselves upon the conscious attainment of real helpfulness to the nation. And well they may, for it is doubtful whether in any other branch of industry or business life there has developed a higher ethical standard or a deeper-seated desire to render service than exists in the public service industry today.

Particularly is this true in the West, and as a result there have come into the editorial office of Journal of Electricity and Western Industry countless inquiries as to how the wonderful series of discussions that have hitherto appeared in these columns under the authorship of S. M. Kennedy of the Southern California Edison Company have indeed been worked out in practice. In response to this insistent demand the author of these articles has set forth on page 453 of this issue details concerning the actual working out of these helpful ideals, and no one can read these lines without being impressed with the sincerity of desire and the high-minded purpose that pervades every action.

These are strenuous times, but the saving grace of the whole situation is that men of the West in the public utility service have proven equal to the occasion, and in these magnificent instances of utility service, such as the one above alluded to, the West has given birth to new ideals of helpfulness that mean much to the civic, industrial and commercial life of the nation, and the people of America, always fair-minded and reasonable, will see to it that they get a just—yes,—a generous reward.

The Timber Wealth of the Northwest

Two and one-half billion dollars is the approximate value of the timber of the West. This region contains some 1,364,000,000,000 feet of soft woods—amounting to about 78 per cent of the supply of the whole country—more than half of this being located in western Oregon and Washington. The timber of other areas in the United States has been rapidly depleted, but it is

estimated that the West still has sufficient to supply the country for some fifty years.

Vital facts concerning this important national asset are presented on another page of this issue. They emphasize in a striking way the necessity for conservation and reforestation on the timber lands. This is not only a matter affecting the lumber industry, but is an important factor in the protection of the water-sheds which are the sources of western hydroelectric power. Statistics show that more than 10,000,000 acres of timber land are burned over every year by forest fires.

The industrial development of the northwest is largely bound up with the lumber industry, which engages directly the services of about 14,000 men as well as many thousands in allied industries. The prosperity of this great region is dependent to a great extent upon the proper handling of the timber tracts, and the constantly increasing use of electricity in saw mills and logging operations is greatly facilitating economical and efficient production. The combination of forest fire protection, reforestation, and modern equipment will do much to conserve the resources of the great northwestern timber lands, while maintaining present production in a high state of efficiency.

Water Masters on California Streams

For some time those who have been interested in the betterment of California water laws have been desirous of securing the establishment of water masters on all streams involving the apportionment of riparian rights. Appropriations recently asked for this purpose from the state legislature have, however, received surprising opposition. There is difficulty in understanding why this measure should be opposed unless from interested parties who are quite satisfied with their present opportunities to overrun their rights on such a stream and who do not wish official interference. As the law at present stands it is the responsibility of the individual to guard his own rights and if they are infringed, to bring the matter to court at his own expense. Naturally many gross infringements go undiscovered under these circumstances, and many more are never brought to justice. It would be an unfair deduction to assume that those who are fighting the bill are contemplating using more water than they are entitled to. But there are many more important causes to which those interested in bettering the conditions of the state may devote themselves. Why oppose a measure so fairly in the interest of progress?

Electricity in National Parks

Improvements, like troubles, seldom come singly. In the wake of the automobile—combined with the western climate—there followed a roadbuilding program which has resulted in some of the finest highways in the world; and now this same automobile is taking thousands of people into the great national playgrounds which are among the West's most treasured possessions. The rapidly growing tourist traffic has inevitably given rise not only to the building of roads in the national parks, but to the erection of numerous hotels, camps, and lodges for the accommodation of those who resent sharing a sleeping bag with a friendly spider under the wide and starry sky.

In increasing the creature comforts of the holiday-maker, electricity is playing no small part. Whether it is brought in from outside or generated by small hydroelectric plants within the park limits, it has been found to be the cheapest, most effective and often the only practicable kind of power for heating, lighting and cooking in the hotels and camps. The electrification has been so thorough in some cases that Yosemite Valley can now boast the most completely electrified hotel in the world, as well as a summer camp with electrically equipped bungalows and an electric kitchen. Electric lighting and heating have also made possible the opening up of these places for a winter-sports season.

The power in most cases is brought into the park from outside, though Yosemite, Yellowstone, and Mount Rainier National Parks have hydroelectric plants of their own. In the last named a sum of $80,000 has recently been expended on a new plant to supply the increasing demand from the various hotels. Plans are also under way for an installation in Sequoia National Park.

Water is of course the natural source of energy, not only on account of its accessibility and abundance, but because of the obvious difficulty and expense of transporting fuel, either oil or coal, over mountain roads into the remote spots where many of these resorts are located. Individual power-light sets have been pioneers here, as in so many other outlying districts, but a hydroelectric supply is the natural successor to this source of power, and the only practicable means of meeting the increased demand.

Los Angeles Water Power Filings

Some time ago Journal of Electricity and Western Industry published a protest against the water power filings of the city of Los Angeles which blanketed most of the unappropriated sites in distant parts of California, including such scenic spots as Illillouette Falls in Yosemite Valley and the Waterwheel Falls in the Tuolumne Canyon. Shortly thereafter, as it became apparent from the general protests that it would be impossible to carry this through, the most conspicuous of these filings were withdrawn—and there seems to be a general impression at the present time that Los Angeles has retired entirely from the field. This is not so.

The recent amendment to the water power bill has indeed removed their interest from Yosemite National Park, but they are still pressing applications on numerous sites in the Kings River canyon, in the main canyon, at the foot of Bubbs Creek and at Cedar Grove, in Tehipiti, at the junction between

the Middle and South Forks, at Grouse Valley and Simpson Meadows. Some of these spots have a special scenic value, some have not; according to competent engineers some present practicable engineering possibilities and some do not— neither of these questions is the vital one involved. The objection still holds against any one city going into the power business on a scale far beyond its own needs with a view to the commercial sale of power. The question still arises as to whether the southern city should be allowed to file on water power which must later serve the future needs of other thriving districts of California.

It is a bit difficult to take this Los Angeles project too seriously. However, it is well to be aware of the fact that the question has not yet been settled.

The Chicago Convention N. E. L. A.

While there is at present a strenuous effort in the Pacific Coast Division, N. E. L. A., and in the Northwest Electric Light and Power Association to put over powerful conventions in their respective districts during the month of June, it must not be forgotten that the great national gathering of the Association is to take place in Chicago, May 31-June 3, 1921, and attendance from this region of the nation should not be neglected.

The questions of public utility financing and of customer stock ownership will be the matters of great present-day interest, and will be presented at this convention by masters in these respective subjects. Men prominent in national legislative halls and among regulating commissions of the nation will also have a vital part in molding the opinions of this great gathering soon to take place.

A number of men have already indicated their intention of attending this convention from the West, and it is to be hoped that a sufficient number may be gotten together to make up a special car and add to the enthusiasm and helpfulness of this great national institution which has now become so well known in the electrical life of the nation. The convention in Pasadena of last year will long linger in the memories of those who had the pleasure of attending, and yet when we say that the gathering which is immediately ahead at Chicago will probably surpass in its business discussions even the papers presented at this former record-breaking convention, it is in no sense to diminish or to take from the glory of the former occasion. Let us see to it, then, that ample representation be sent to the Chicago convention.

The New Record in Reaction Turbines

The opening up of the Southern California Edison No. 3 reaction turbine unit, built by the Pelton Water Wheel Company of San Francisco, establishes a new and interesting record in hydraulic practice. The waters for this big turbine fall from a vertical height of 902 feet, thus surpassing any attainment hitherto attempted in this type of design. One of the most interesting outstanding features of this installation, however, is not only the question of high head reaction design, but also the fact that the new turbine makes possible the delivery of 50-cycle as well as 60-cycle alternating current, and many ingenious ideas have been made use of in its design. In order to change from 50-cycle to 60-cycle generation, only the lower portion of the runner is changed over. By means of roller bearings the runner design for 60-cycle generation is brought in, and the other runner taken from the turbine setting. The entire adjustment can be made to take place in less than twenty-four hours; thus it is made possible to deliver 50-cycle or 60-cycle current from the same water wheel unit, which in the Southern California Edison system is an accomplishment that will aid greatly in continuity of service and pliability of operation. On this accomplishment all well-wishers of the West offer their sincere congratulations.

What Is Your Overhead?

When a contractor-dealer begins to complain about the margin of profit in handling some current-consuming device, the manufacturer at once asks, "What is your overhead? What does it cost you to run your business?" The answer is anywhere from seventeen to twenty-five per cent, depending on the system of accounting, the location and volume of business and the salary the owner allows himself. It is hardly fair to compare the cost of doing business in the city with the cost of doing business in the country, where rents are lower and the competition is not as keen. While the overhead may be fairly indicative of the efficiency of the owner of an establishment, at the same time he may be paying himself a smaller salary and working longer than would be possible in the case of anyone he might employ. The salary the owner of the business allows himself should be the same salary that he would have to pay anyone to take his place and do an equal amount of work. This would probably bring up the overhead of some of the contractor-dealers considerably, and in all fairness to themselves they should keep an accurate account of the exact cost of doing business so that they will know to what margin of profit they are really entitled.

Lamp Socket Appliances

One of the great accomplishments of the California Electrical Cooperative Campaign during the past year has been along the lines of the use of the convenience outlet in the home electrical. Advertisers are urged no longer to show appliances connected to lamp sockets. The architect and home builder have been reached in a helpful way, and the housewife has seen these appliances properly installed in the home. The good of this work can hardly be overestimated. It is to be noted that a number of the major utility companies of the West still include lamp socket appliances as a special subdivision of load carried by the power com-

panies in their annual report statements. Would it not be a good plan to change this over to some other name on the books of the individual company and thus help along the good work that is being done in the direction of greater utilization of the convenience outlet in the home?

The Electric Truck Situation

There is growing an insistent demand that greater attention be given to the subject of the electric truck in its various uses throughout the West. The electric truck has unquestionably demonstrated its economic usefulness in all those situations where frequent stops are required and a distance of not to exceed thirty miles in delivery is to be covered. As a typical instance, bakery wagons may be cited, as an ideal electric delivery truck service. There is no question but that the electric truck, due to the off-peak hours utilized in recharging offers one of the most ideal central station loads to be found, and while the driver of the electric truck is wont at times to complain of the somewhat slower speed than the gas driven car, such a complaint should not be given a scientific standing, for after all there is some question as to whether modern high speed delivery does not introduce more disasters in commerce than it gains in the saving of time. It is to be hoped that more earnest consideration will be given the study of the electric truck and its possibilities in the commercial and industrial life of the West.

Industrial Criticism of the Y. W. C. A.

There was recently circulated among the members of a western manufacturing association a reprint from a national magazine attacking the industrial policy of the Y. W. C. A. Most of the things of which this religious and social organization is accused are undoubtedly true. They have thought of the problem of the working girl almost entirely from the human standpoint and with very little consideration of, say, the sales market for the goods which are being manufactured; they have recommended to the young mind reading on economic questions—and it should be understood that almost all economists have theories on the labor question—and they have favored collective bargaining as a means for bettering pay checks and bettering working conditions which they have found not always model. All these things they have done apparently in a decently open-minded fashion—indeed, after reading the indictment of their labor leanings, it is difficult to become very excited over the dangers of so reasonable a radicalism.

After all, the employment problem is one for study and there is no crime in its consideration, even if our conclusions somewhat condemn present conditions. Labor has too often put itself in the wrong by assuming that its cause had nothing in common with capital and that its justice might not be discussed. The employer, unfortunately, is prone to take a similar attitude on the other side of the fence. It is well that we have such organizations as the Y. W. C. A. to bring to our minds occasionally the fact that there are not two sides to the question of labor and capital, but only one—that of the greatest human benefit.

Big Increase in Transcontinental Telephone Service

The popularity of the transcontinental telephone service seems to be increasing. Particularly popular are the midnight calls from twelve o'clock to four o'clock in the morning, when exceedingly low rates are given between Pacific Coast points and eastern business centers. The rate, for instance, from San Francisco to Florida is only $3.70 for a three-minute talk at this period of the day. Men of industry throughout the West will be interested to know that this transcontinental service has grown to such gigantic proportions that at the present time the telephone company is handling over one hundred calls per day over its transcontinental wires at this off-peak period. Business intercourse between the East and the West will receive a new impetus due to this growing service of the telephone company, and men of the industry throughout the West will do well to make increasing use of this important type of intercommunication. Personal contact after all is the big drive that brings business, and next to being present in body is that of being present in voice with your business prospect.

A Developer of Community Spirit

Those who have followed the interesting advances in radio telephony, which have come with the installation of the Magnavox, whereby orchestras, soloists and public speakers may be heard in private rooms miles from the place of delivery, are following with unusual interest the effect this is having in the development of community spirit. It is not difficult to follow the growth of this new incentive for better neighborhood feeling when one reads of the most interesting demonstration that was put through at a meeting of the San Francisco Rotary Club recently in the Palace Hotel. At this particular demonstration Ellery Stone, of the Moorhead Laboratories, the largest manufacturers of radio vacuum tube instruments in the world, placed an instrument so that the Rotary Club speakers and the applause which followed the speeches, as well as the music and singing, could be heard at the Letterman Hospital several miles away, where wounded soldiers listened with rapt attention to the concert in the business center of San Francisco.

The device is becoming increasingly popular in private homes, where music for private dancing is caught from the radio service of theatrical centers, such for instance, as the California Theatre in San Francisco. One of the best evidences of the growing popularity of this service is the fact that over five hundred private homes are now using this service in and about the San Francisco Bay region.

This use has been protested by members of the Musicians' Union.

MANUFACTURES IN COLORADO, MONTANA AND UTAH FOR 1919

The Bureau of Census, Department of Commerce, has issued preliminary statements of the general results of the census of manufactures for the states of Colorado and Utah, and comparisons with the census of 1914. For all states there is a consistent increase.

From the percentage standpoint the increases, in the order of their importance, rank as follows, for the state of Colorado: Value added by manufacture, 110 per cent; salaries, 105 per cent; wages, 104 per cent; value of products, 101 per cent; cost of materials, 97 per cent; salaried employes, 53 per cent; capital, 34 per cent; proprietors and firm members, 30 per cent; wage earners, 29 per cent; number of establishments, 24 per cent; and primary horsepower, 20 per cent.

	CENSUS		Per cent of increase
	1919	1914	1914-1919
Number of establishments	2,631	2,126	23.7
Persons engaged in manufactures	44,731	33,715	32.7
Proprietors and firm members	2,234	1,716	30.2
Salaried employes	7,241	4,721	53.4
Wage earners (average number)	35,256	27,278	29.2
Primary horsepower	194,634	162,828	19.5
Capital	$243,827,000	$181,776,000	34.1
Services	54,329,000	26,568,000	104.5
Salaries	13,049,000	6,368,000	104.9
Wages	41,280,000	20,200,000	104.4
Materials	176,600,000	89,756,000	96.8
Value of products	275,391,000	136,839,000	101.3
Value added by manufacture (value of products less cost of materials)	98,791,000	47,083,000	109.8

Summary of manufactures for 1919 and 1914, for the state of Colorado, as published by the Bureau of Census, Department of Commerce. Preliminary figures.

The capital invested, as reported in 1919, shows a gain of $62,051,000, or 34.1 per cent over 1914. The average capital per establishment was approximately $93,000 in 1919 and $86,000 in 1914. The cost of materials used in 1919 shows an increase of $86,844,000 or 96.8 per cent over that of 1914. The average cost of materials per establishment in 1919 was approximately $67,000, and in 1914, $42,000. The value of products in 1919 shows an increase over that of 1914 of $138,552,000, or 101.3 per cent. The average per establishment in 1919 was approximately $105,000 and in 1914 $64,000. The value added by manufacture represents the difference between the cost of the materials used and the value of the products manufactured from them; in 1919 this showed an increase of $51,708,000 over 1914, or 109.8 per cent. The value added by manufacture in 1919 formed 45.4 per cent of the total value of the products and in 1914, 34.4 per cent.

For Montana, in the order of their importance from a percentage standpoint, the increases for the several items rank as follows: Cost of materials, 162 per cent; value of products, 132 per cent; value added by manufacture, 94 per cent; wages, 90 per cent; primary horsepower, 84 per cent; capital, 74 per cent; salaries, 71 per cent; proprietors and firm members, 44 per cent; number of establishments, 38 per cent; salaried employes, 28 per cent; and wage earners, 25 per cent.

The capital invested as reported in 1919, shows a gain of $58,253,000, or 73.5 per cent over 1914. The average capital per establishment was approximately $106,000 in 1919 and $84,000 in 1914. The cost of materials used in 1919 shows an increase over that for 1914 of $75,646,000, or 161.8 per cent. The average cost of materials per establishment in 1919 was approximately $95,000, and in 1914, $50,000.

	CENSUS		Per cent of increase
	1919	1914	1914-1919
Number of establishments	1,294	939	37.8
Persons engaged in manufactures	20,698	16,363	26.5
Proprietors and firm members	1,200	832	44.2
Salaried employes	2,332	1,827	27.6
Wage earners (average number)	17,166	13,704	25.3
Primary horsepower	169,056	91,671	84.4
Capital	$137,499,000	$79,246,000	73.5
Services	29,493,000	15,780,000	86.9
Salaries	4,741,000	2,779,000	70.6
Wages	24,752,000	13,001,000	90.4
Materials	122,390,000	46,744,000	161.8
Value of products	195,624,000	84,446,000	131.7
Value added by manufacture (value of products less cost of materials)	73,234,000	37,702,000	94.2

Summary of manufactures for 1919 and 1914, for the state of Montana, as published by the Bureau of Census, Department of Commerce. Preliminary figures.

The value of products in 1919 shows an increase over that of 1914 of $111,178,000, or 131.7 per cent. The average per establishment in 1919 was approximately $151,000 and in 1914, $90,000. The value added by manufacture in 1919 shows an increase over that of 1914 of $35,532,000. Value added by manufacture in 1919 formed 37.4 per cent of the total value of the products and in 1914, 44.6 per cent.

For Utah, in the order of their importance from a percentage standpoint, the increases for the several items rank as follows: Capital, 100 per cent; salaries, 99 per cent; wages, 97 per cent; value added by manufacture, 86 per cent; value of products, 80 per cent; cost of materials, 78 per cent; primary horsepower, 55 per cent; salaried employes, 41 per cent; wage earners, 36 per cent; proprietors and firm members, 9 per cent; and number of establishments, 5 per cent.

The capital invested, as reported in 1919, shows a gain of $71,523,000, or 99.6 per cent over that in 1914. The average capital per establishment was approximately $124,000 in 1919 and $65,000 in 1914. The cost of materials used in 1919 shows an increase over that of 1914 of $48,372,000, or 77.7 per cent. The average cost of materials per establishment in 1919 was approximately $95,000, and in 1914, $56,000.

	CENSUS		Per cent of increase
	1919	1914	1914-1919
Number of establishments	1,159	1,109	4.5
Persons engaged in manufactures	23,058	17,126	34.6
Proprietors and firm members	1,089	999	9.0
Salaried employes	3,142	2,233	40.7
Wage earners (average number)	18,827	13,894	35.5
Primary horsepower	92,236	59,536	54.9
Capital	$143,366,000	$71,843,000	99.6
Services	27,064,000	13,696,000	97.6
Salaries	5,668,000	2,844,000	99.3
Wages	21,396,000	10,852,000	97.2
Materials	110,605,000	62,233,000	77.7
Value of products	156,804,000	87,112,000	80.0
Value added by manufacture (value of products less cost of materials)	46,199,000	24,879,000	85.7

Summary of manufactures for 1919 and 1914, for the state of Utah, as published by the Bureau of Census, Department of Commerce. Preliminary figures.

Value of products in 1919 shows an increase over that of 1914 of $69,692,000, or 80 per cent. The

average per establishment in 1919 was approximately $135,000 and in 1914, $79,000. The value added by manufacture in 1919 shows an increase over that in 1914 of $21,320,000, or 85.7 per cent. The value added by manufacture in 1919 formed 29.5 per cent of the total value of the products and in 1914, 28.6 per cent.

OVERHEAD OR BURDEN IN COSTS — ITS PROPER TREATMENT IN STABILIZING PRICES

At the annual convention of the United States Chamber of Commerce held at Atlantic City April 27 to 29 the Fabricated Production Department took up the subject of overhead in costs and its proper treatment in the stabilization of prices; this was in line with the campaign that this department has been carrying on for the adoption of uniform accounting methods. Some of the important points to be considered in this connection are noted in the following quotation from a statement issued by this department:

"A number of cost systems fall down when they are most needed—in periods of depression. The little business that exists is throttled when full overhead charges are loaded upon a low production, whereupon manufacturers distrusting their cost figures sell for what the market will bring, and thus intensify the demoralization.

"Some progressive manufacturers are meeting this problem by charging overhead expenses into production on the basis of a normal year. When production is more than normal, a surplus from overhead will accrue. In times of subnormal production, as at present, the entire load of overhead will not be charged into production, but only so much of it as production will warrant.

"It is not proposed to compromise or abandon a single dollar of expense, but to regulate its absorption in a way fair to the manufacturer and to the public as well. This method of overhead distribution has numerous advantages, two of which may be stated as follows:

"It will assure the business man a reward for his efforts in speeding-up.

"It will minimize throttling of business by loading semi-normal production with greater charges than can be borne."

PERSONAL RESEARCH FEDERATION

One of the most important phases of modern industrial relations has to deal with the factors affecting the individual from the point of health, efficiency and industrial unrest. Throughout the country individual firms, engineering societies, federal and state government and others are studying the problems, and to coordinate these endeavors the Personal Research Federation has been organized under the auspices of the National Research Council and the Engineering Foundation. The Federation includes in its membership scientific, engineering, labor, management and educational bodies. The purpose is to bring about interchange of research information among the numerous organizations engaged in research work along these lines.

The aims for the new organization are: Increased efficiency of all the personal elements of industry — employer, manager, worker — and improved safety, health, comfort and relationships.

After learning what organizations are studying one or more problems relating to personnel and the scope of their endeavors it is the intention to determine whether these can be harmonized, neglected phases of the problems considered and advanced work undertaken. The Federation is not another agency for research, but rather a clearing house for the existing agencies.

ALASKA EXPORTS LAST YEAR TOTAL OVER SIXTY MILLION DOLLARS

Shipments from Alaska to the United States in the calendar year 1920 amounted to $60,939,061, against $60,479,548 in 1919. The principal article shipped to the United States was canned salmon, which amounted to 205,961,810 pounds, valued at $37,998,478, in 1919, and 194,670,630 pounds, valued at $34,781,970, in 1920. Fresh, pickled, dried, smoked and kippered fish, clams and shrimps, aggregating $3,407,702 in value, were shipped to the United States in 1920.

Copper ore consignments with 47,803,180 pounds copper contents were valued at $10,304,807 in 1919, and 76,145,794 pounds copper valued at $14,006,477 in 1920. Other metals shipped to the United States are lead, tin ore, tungsten ore, palladium and platinum. A total of 30,208 sealskins, valued at $1,510,400, and other fur skins worth $1,767,474 were purchased by the United States in 1920.

Shipments of gold ore and bullion from Alaska to the United States show a decrease in 1920 compared with 1919. Gold ore and bullion exported in the year ending December 31, 1919, were worth $7,952,485, as against $6,491,336 in 1920. The shipments of silver ore and bullion increased from $511,977 in 1919 to $867,100 in 1920.

Sixty million dollars in exports in one year will recall the $7,200,000 paid to Russia in 1867. At that time the purchase was characterized as an investment of doubtful value.

LUMBER CUT OF PACIFIC NORTHWEST MILLS

Estimates of the 1920 lumber cuts of some of the largest mills in the Pacific Northwest are given by the Oregon Voter as follows:

Bellingham—Bloedel-Donovan	146,000,000
Tacoma—St. Paul & Tacoma	110,000,000
Hoquiam—Grays Har. Lbr. Co.	100,000,000
Portland—Inman-Poulsen	144,000,000
Astoria—Hammon Lbr. Co.	120,000,000
Marshfield—Coos Bay Lbr. Co.	130,000,000
Bend—Shevlin-Hixon Co.	115,000,000
Boise—Boise-Payette Lbr. Co.	141,000,000
Potlatch—Potlatch Lbr. Co.	130,000,000

Electricity Basic in Development of Timber Resources

The Former Chief of the Timber Section of the Bureau of Internal Revenue Tells of the Wonderful Timber Resources of the West and States That Electrical Energy from Western Water Power Makes Possible a More Profitable Product

When the great World War aroused this country to action it found David T. Mason a professor of forestry at the University of California. He had received his intensive forestry training at Yale and had later spent many years in practical experience as assistant district forester in the Northwest. Volunteering at once, he was made a first lieutenant, was soon promoted to the rank of captain and later received his majority for efficient service. In France his wonderful work and accomplishments in organizing certain of the timber sections for production in the cause of the Allies is now a matter of historic record. Returning to the United States at the conclusion of the war he was at once called to the federal service for the Bureau of Internal Revenue, where as chief of the Timber Section he has recently compiled for the government an exhaustive research report regarding the timber ownership and lumber production in the Inland Empire of the Northwest.

DAVID T. MASON
One of our leading authorities in present-day valuation of Western timber resources.

We feel that no more authoritative statement on the development of the West in its timber resources could be made than this one coming from Major Mason. In an interview with a representative of Journal of Electricity and Western Industry as to the timber resources of the West and the part that electricity is destined to play in their harvesting he said:

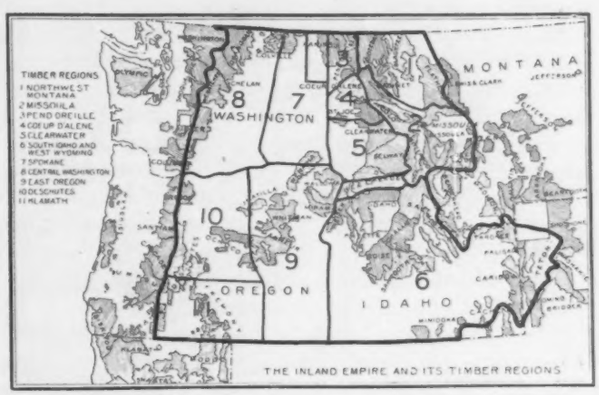
"The latest estimates made in 1920 by the U. S. Forest Service indicate that the total supply of soft wood timber of the United States amounts to approximately 1,760,000,000,000 board feet. The Northeastern states have only 54,000,000,000 feet of this supply. The Lake states and Central states have 52,000,000,000 feet, the South Atlantic and Gulf Coast states 285,000,000,000. Thus the West, with 1,364,000,000,000 feet, has approximately 78 per cent of the country's supply of soft woods.

"The western timber is disposed in the following way: More than one-half, or 685,000,000,000 feet, is in the Douglas Fir region in western Oregon and western Washington. 315,000,000,000 feet is found in the Inland Empire which includes eastern Oregon, eastern Washington, Idaho, and western Montana. California in its Pine and Redwood regions has 294,000,000,000 feet. The remaining 70,000,000,000 feet is scattered through the Rocky Mountain states, south of Montana, and in Arizona and New Mexico.

"While about four-fifths of the soft wood supply of the country is in the West, only about two-fifths of the annual production is cut in the West. During the past sixty years forest industries have seen their centers of production shift successively from the Northeast to the Lake states, from the Lake states to the Southern states, and now the shift from the South to the West is about to take place. While other regions are approaching exhaustion, the West still has enough timber to supply the country for possibly fifty years, provided that it is properly protected. A large expansion of the lumber industry in the West will no doubt occur during the next decade.

"The timber of the West is one of our greatest natural assets, at present market values worth perhaps two and one-half billion dollars. It is an asset, however, which will increase materially in value in the future. Some idea of the quantity of the timber can perhaps be gained when it is realized that a billion feet of timber sawn into lumber and loaded into standard freight cars, would make up a train 417 miles long. Thus, all of the western timber is sufficient to make up a string of freight cars encircling the earth 22 times.

"The protection of our timber supplies is so important to the welfare of the nation as a whole that President Harding, on April 7, signed a proclamation setting aside the week of May 22 to 28, 1921, as Forest Protection Week, requesting all citizens to plan for that week educational and instructive exercises to bring before the people the serious waste



A map of the Inland Empire. The darker portions indicate the locations of its timber regions, where general conditions are similar.

caused by the 30,000 or more forest fires which each year burn over more than 10,000,000 acres and cause a loss of approximately $20,000,000. Protection of forests from fire is of great importance not only for the sake of future timber supplies, but also for the protection of the water sheds from which hydro-

electric power is secured. Those interested in water power will be greatly benefited by thoroughly effective fire protection.

"While the great quantity of timber of merchantable size is a vastly important western resource, the prosperity of future generations demands the perpetuation of the forests through careful management. Western timber owners and lumbermen have gone on record in favor of managing forest lands for the permanent production of crops of timber. Such a policy will fit in closely with the interests of hydroelectric power producers, some of whom in time will perhaps become important forest owners for the protection of their water sheds.

"I believe that electricity is basic in the development of our western timber resources. The rapidly increasing economies in the handling of logging by the method electrical, together with the pliability of the electric drive in the saw mills and lumber factories of the West, can only mean that the continued advance in the development of our western water power resources will make possible a cheaper, better and more profitable product from our great standing timber resources of the West."

Some Facts Regarding Water Power Legislation

(Water power legislation has always been of interest to the West on account of the vast tracts of public lands in that section upon which lie some of our greatest undeveloped water power resources. When it is considered that over half of this Western country is owned by the government, not including the National Parks, more attention should be paid to the laws which have been passed regarding the use of water on public lands.—The Editor.)

Forest conservation is important in protecting water sheds which are sources of hydroelectric power.

THE West, on account of its arid condition, has always been interested in the development of water, and it is interesting to note that the first practical and modern irrigating accomplished in the United States was in California by the Spanish padres around the missions they established up and down the coast. The next irrigating plan was in Utah through the industry of the Mormons in 1847, and then by the Greeley colony in Colorado in 1870. After this numerous other irrigation projects sprang up in the West most of which were based upon the cooperative idea, each colony forming its own laws regarding the use of water. The first law recognized a prior right to the water by actual use of it. Shortly after the formation of the Mormon colony in Utah, gold was discovered in California.

In the early processes of mining, water was essential, and each mining camp established its own laws and customs regarding the use of water which later were consolidated into the water laws of the state.

In the search for gold it was only natural that the miners finding the precious metal on the public lands should work to realize upon it, with the result that dams and ditches were built upon the public domain. This led to considerable argument in the East, and attempts were made to confiscate these works which had been erected upon the lands owned by the government. This agitation provoked the act of 1866, and section 17 of the act approved July 9, 1870. By these acts the water of all lakes, rivers and other sources of water supply upon the public lands and not navigable was declared to be free and open for appropriation, diversion and use wherever appropriation was recognized by the local customs, laws and decisions of the courts as a means of acquiring the right to use the water so appropriated for beneficial uses; and by these acts Congress made an unequivocal grant of rights-of-way for the construction, maintenance and use of reservoirs, ditches and canals as a means of enabling the appropriators of water to impound and store, and to distribute and put to beneficial uses the water so lawfully appropriated. The act of 1866 recognized the existing canals, ditches and dams and stated that "the possessors and owners of such vested rights shall be maintained and protected in the same."

These earlier acts did not mention any reservations of the United States in connection with the grant of authority to appropriate water and rights-of-way for reservoirs and canals, define the extent or limits of the rights-of-way thus granted, or contain any provision for issuing to the appropriators any evidence of title, or for making any public record of the rights-of-way located or acquired.

These defects were remedied by the passage of an act in 1891 which granted a right-of-way of a definite width through public lands and reservations of the United States for canals, ditches and reservoirs to any canal or ditch company formed for the purpose of irrigation. These companies had to file with the Secretary of the Interior a copy of their articles of incorporation, and had to file maps and plats of the location of the reservoirs, canals and ditches in the land office of the district in which the canals were located.

It is interesting to note that in 1895 an act was passed giving the Secretary of the Interior the right to grant "rights-of-way through the public lands of the United States, not within the limits of any park, forest, military or Indian reservation, for tramroads, canals or reservoirs to the extent of the ground occupied by the water of the canals and reservoirs and fifty feet on each side of the marginal limits thereof; or fifty feet on each side of the center line of the tramroad, by any citizen or any association of citizens of the United States engaged in the

business of mining or quarrying or of cutting timber and manufacturing lumber." Eighteen months later an amendment was passed to this act which gave the Secretary of the Interior the right to grant rights-of-way "to the extent of twenty-five feet, together with the use of the necessary ground, not exceeding forty acres, upon the public lands and forest reservations of the United States, by any citizen or association of citizens of the United States for the purposes of generating, manufacturing, or distributing electric power."

There were various other acts and amendments to the existing laws relating to the use of water on public lands and the use of navigable rivers, but none of these was of especial importance until the act of 1901 which granted the Secretary of the Interior power to permit power development inside of the Yosemite, Sequoia and General Grant National Parks in California. In 1905 the forest reserves were transferred from the jurisdiction of the Secretary of the Interior to the Secretary of Agriculture by a special act approved February first which allowed the rights-of-way across the forest reserves.

The act of 1901 had the effect of suspending the operation of all of the previous laws for all of the uses of water upon the public lands or reservations of the United States, since it provided for the permits for such use in a far more inclusive and definite manner than did the act of 1896 with respect to the use of the rights-of-way for electric power purposes. The lack of certainty of tenure, the imposition of excessive rental charges, the regulation of rates for service, the possibility of cancellation of the permits, the cumbersome procedure, the lack of authority of local officials, unreasonable delays in obtaining rulings and action, absence of centralization of authority—it being necessary sometimes to deal with the Secretary of the Interior and sometimes with the Secretary of Agriculture—and the injustice of the regulations when but a minor part of the project was on public lands, all tended to make a development on the public domain unattractive to both investors and operators, especially if in actual or potential competition with other companies owning their plants in fee simple. The fear that water powers on the public domain would be developed by grasping capitalists for the purpose of exploiting a defenseless public is now almost entirely dispelled by the authority granted to the public service commissions of power to regulate rates between the producer and the consumer.

The war brought out defects in the national utilization of power which had not been fully realized by the public or Congress, and as a result the Federal Water Power Act was brought before Congress and approved June 10, 1920, and signed by President Wilson with the understanding that an amendment would be passed at the next session of Congress prohibiting the development of power in the national parks. This was done and on February 26, 1921, an amendment was passed to that effect. The full text of that bill is as follows:

A BILL

To amend an act entitled "An Act to create a Federal Power Commission; to provide for the improvement of navigation; the development of water power; the use of the public lands in relation thereto; and to repeal section 18 of the River and Harbor Appropriation Act, approved August 8, 1917, and for other purposes," approved June 10, 1920.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled:

That hereafter no permit, license, lease, or authorization for dams, conduits, reservoirs, power houses, transmission lines, or other works for storage or carriage of water, or for the development, transmission, or utilization of power, within the limits, as now constituted, of any national park or national monument shall be granted or made without specific authority of Congress, and so much of the Act of Congress approved June 10, 1920, entitled "An Act to create a Federal Power Commission; to provide for the improvement of navigation; the development of power; the use of the public lands in relation thereto; and to repeal section 18 of the River and Harbor Appropriation Act, approved August 8, 1917, and for other purposes," as authorizes licensing such uses of existing national parks and national monuments by the Federal Power Commission is hereby repealed.

The Federal Water Power Act is a step in the right direction toward the development of the water power resources which lie in the West and compose nearly seventy per cent of the undeveloped water power of the United States. The accompanying table shows that over fifty per cent of the area of the Western states is public land and approximately ninety-four per cent of the undeveloped water power in the West is upon these public lands, so that the people of the West may well consider that they have a more than passing interest in any new water power legislation and in any amendments to the present water power act.

PUBLIC LAND BY STATES AND RATIO OF AREA TO TOTAL AREA OF STATE

State	Total Area Sq. Miles	Total Area Acres	Area Public Land Acres	Per Cent	National Park Area Sq. Miles
California	158,360	101,350,400	41,409,217	41.	1,505
Washington	69,180	44,275,200	11,591,961	26.	324
Oregon	96,030	61,459,200	30,122,565	49.	249
Nevada	110,700	70,848,000	60,494,030	85.	.....
Arizona	113,020	72,332,800	52,207,720	72.	958
Idaho	84,800	54,272,000	35,628,066	66.	.....
Utah	84,970	54,380,800	41,116,316	76.	120
Montana	146,080	93,491,200	37,795,007	40.	1,534
Wyoming	97,890	62,649,600	40,628,216	65.	3,348
Colorado	103,925	66,512,000	32,776,990	49.	475
New Mexico	122,580	78,451,200	40,394,144	51.	.....
Western States Total.		760,022,400	424,164,232	56.5	
South Dakota	77,650	49,696,000	4,249,612	9.	17
North Dakota	70,795	45,308,800	1,162,854	3.	1
Nebraska	77,510	49,606,400	925,896	2.	.....
Kansas	82,080	52,531,200	236,511	.5	.....
Oklahoma	70,057	44,836,480	103,116	.2	1
Minnesota	83,365	53,353,600	2,484,754	5.	.....
Missouri	69,415	44,425,600	713	.....	.....
Arkansas	53,850	34,464,000	1,700,860	5.	1
Louisiana	48,720	31,180,800	78,014	.2	.....
Wisconsin	56,040	35,865,600	9,880	.03	.....
Mississippi	46,810	29,958,400	41,660	.13	.....
Michigan	58,915	37,705,600	173,768	.5	.....
Alabama	52,250	33,440,000	77,600	.2	.....
Florida	58,860	37,670,400	669,557	2.	.....

Since the Federal Power Commission, appointed by the act of 1920, has been in existence, it has been literally swamped with applications for permits to develop power on the public lands, and the great majority of these applications have been from the Western states. Various rules and regulations have been sent out by the Federal Power Commission governing the manner in which applications for permits, and permits shall be made out, and while there are fifteen requirements in the shape of maps, plats, etc.,

some of which must be filed in triplicate in the application for a license for a major project, it is hoped that the requirements will not involve so much red tape as to keep the smaller companies from making applications. Some of the other regulations take up such matters as the depreciation reserves, amortization reserves, expropriation of excessive profits, allocation of earnings and accounts and reports. Other regulations will be issued from time to time by the commission, and it is safe to assume that the time has passed when locking up the water power resources of the nation is assumed to be an act of conservation. For with the oil fields nearing exhaustion and the coal becoming more difficult to mine each year, coupled with the fact that when once used these are gone for good, it is seen that the greatest conservation is to be secured by the utilization of our national water power resources.

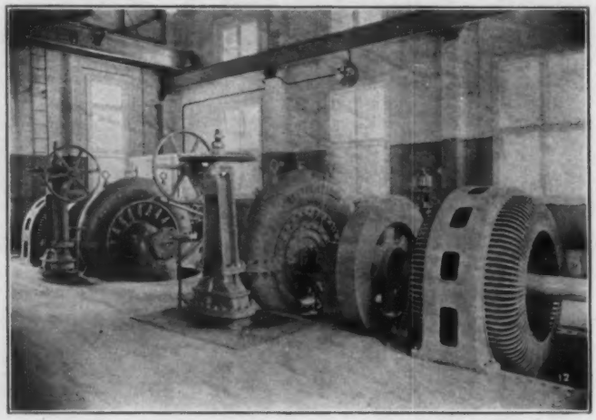
Electrifying Yosemite Valley

BY NORMAN S. GALLISON

(The fame of Yosemite's waterfalls and granite cliffs draws every year thousands of beauty-seekers from all over the world. How the travelers are made comfortable with the latest of electrical equipment in hotels and camps is described here by a member of the research department of the Federal Reserve Bank of San Francisco, who is also a native of Yosemite Valley. —The Editor.)

Yosemite, the world's most popular year-round playground, famed for its inspiring grandeur and unsurpassed natural beauty, is perhaps the most "electrified" community of its size in the world.

Back view of intake at dam on Merced River. The water is carried in a 54-inch redwood stave pipe, 6,000 ft. in length, to the power house.



Interior of Yosemite power house. The turbines operate under a head of 330 ft., each of the two units having a capacity of 1,000 kw.

The roaring snow-fed streams which pour down from the Sierras above, provide a constant source of electric energy which has been utilized to the fullest extent by those engaged in providing for the comfort and enjoyment of the ever-increasing numbers of visitors.

Yosemite Power Plant

Energy for cooking, heating, lighting and power is obtained from the power plant operated in the Park by the United States Department of the Interior, and is distributed at reasonable rates to the concessionaires. The original power plant, which for many years was located at Happy Isles at the upper end of the Valley floor, was unable to meet the increasing demands made upon it, and was replaced in 1918.

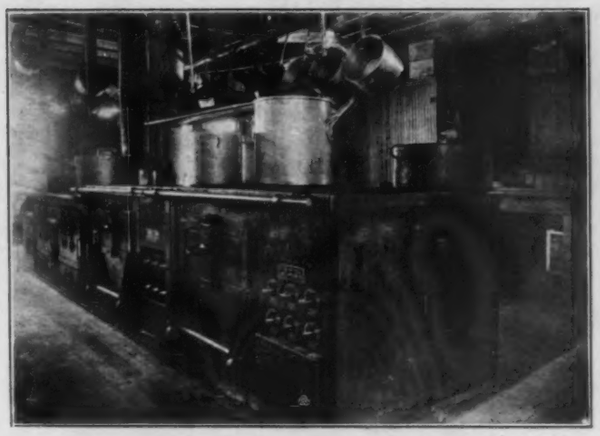
The present plant is located about six miles below Yosemite village, in the Merced river canyon. This plant, whose total cost of $212,000 was authorized under congressional appropriations of July 1, 1916, June 12, 1917 and March 28, 1918, was continuously under construction from August, 1916, to its first operation in May, 1918.

It consists of a log crib diversion dam across the Merced river about a mile below Pohono Bridge, with concrete headworks opening into a 64-inch concrete pipe 400 feet long. This gives into a 54-inch redwood stave pipe which in connection with a steel pressure pipe of the same diameter, delivers water to the turbines under a head of 330 feet. The plant equipment consists of Pelton turbines direct connected to two General Electric 1000-kw. generators. The current passes from the plant on a three-phase transmission system to the main distributing point near Yosemite village.

The present connected load of all consumers during the summer months is 1500 kw., while the estimated future requirements of the largest consumer, the Yosemite National Park Company, is 8,000 kw. During the last summer, this company supplied 61 per cent of the connected load, the Department of the Interior 21.4 per cent and the other concessionaires 17.6 per cent.

Winter Hotel Accommodation

Efforts are being made to familiarize the public with the beauty and charm of Yosemite in winter, and in order to provide the maximum of service and comfort for its patrons, the Yosemite National Park Company installed complete electrical equipment in the Sentinel Hotel, which is the only hotel in the



Electric range installation at the Sentinel Hotel in Yosemite Valley. These kitchens care for approximately 100 guests. A larger installation at Camp Curry serves over 1,000.

Electric grills at Yosemite Lodge. The lodge accommodates about 800 guests in bungalows and tents, and has among other installations a large modern laundry.

valley proper, and which is open all the winter. All rooms are heated by Hewes type air heaters of from 3,000 to 5,000-watt sizes. During the past winter this was the only source of heat and it met with general approval. Each of the redwood cabins at Yosemite Lodge is equipped with an individual 3,000-watt water heater, and headlight type air heaters. The kitchen equipment includes electric ranges, ovens, griddles, toasters, coffee urns, and dish warmers manufactured by the Edison Electric Appliance Company.

Hot water is supplied from a 350-gallon storage tank equipped with five 3,000-watt outside circulating heaters. These heaters are installed so that they function as individual units. The bath rooms are all equipped with individual installations of similar design.

Electrical Kitchens

A variety of electrically operated machines are used in addition, including dish washers, and refrigeration and ice cream plants.

Kitchens at Glacier Point, Yosemite Lodge, Camp Tecoya and Hetch Hetchy Lodge are all equipped with electric griddles, toasters and urn heaters. Camp Curry has a complete electrical kitchen and bakery. It is proposed gradually to replace the oil-burning ranges and ovens with electrical equipment similar to that being used at the Sentinel Hotel.

The ultimate electrical power requirements of the Yosemite National Park Company, based on their building program covering a period of from three to five years, is estimated at 8,000 kw. The proposed installations will include 22 ranges, 9 bake ovens, 18 griddles, 18 toasters, 70 urn and dish heaters, 830 hot water heaters, 650 air heaters and 350 domestic ranges.

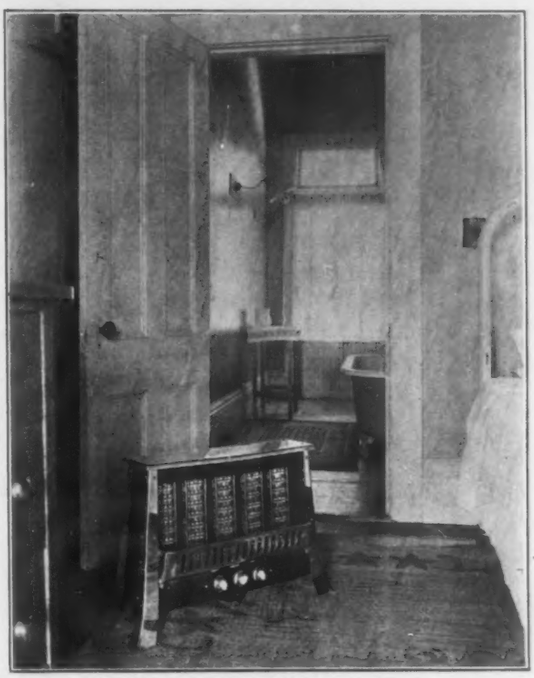
The high cost of transporting fuel compared with the abundant energy in the countless inexhaustible mountain streams of the Park has decided what the future equipment shall be. The success of the installations at the Sentinel Hotel during the past winter has demonstrated the feasibility of the plans.

The Hotel Grizzly, which is soon to be constructed to care for the throngs of enthusiasts who come in constantly increasing numbers, will be equipped throughout with the latest devices.

Residential Equipment

The homes of the government employes, the permanent residents of the Yosemite, are in most cases furnished with electrical cooking and heating appliances. All the thoroughfares between camps, and the grounds of all camps, are electrically lighted.

Now that the economy and simplicity of electricity have been demonstrated, it is expected that



An open electric heater in a Sentinel Hotel guest room. Conveniences of this kind have made it possible to open the hotel for a winter sports season.

it will be the only source of heat, light, or power used by the modern residents and visitors in the world-famous valley.

Opening Up America's Playgrounds

An electrically equipped bungalow at Yosemite Lodge in the Yosemite Valley, California. This camp has a large electrical cooking installation which handles all the cooking and baking for over 800 guests.

Crater Lake, in Crater Lake National Park. A recently installed Delco plant furnishes the electric light for Crater Lake Lodge, one of the two establishments so far erected to accommodate visitors to this park.

Electrical heating and other modern hotel conveniences have made possible the opening up of Yosemite Valley as a winter resort as well as for the usual summer season, and a considerable number of visitors now come for the winter sports. The output of the power plant for 1920 showed an increase of 40% over that of 1919.

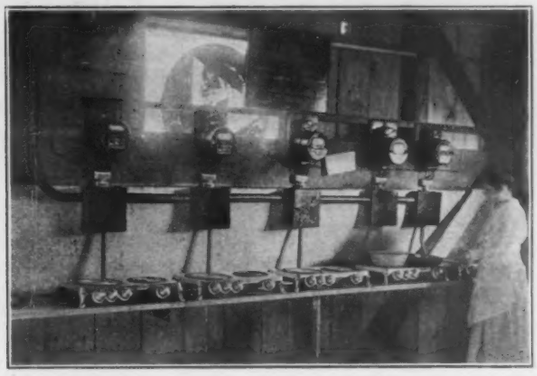
Giant Forest, in the Sequoia National Park. A suggestion was made to move the old Yosemite Valley power plant to this point, but the growing demand for lighting and other electrical conveniences will probably result in the building of a small new plant. Airplane forest patrol is an important factor in preserving the big trees.

Mammoth Hot Springs, headquarters of the Yellowstone National Park. The hydroelectric plant near this point generated 148,260 kw-hr. during 1920, of which 130,076 kw-hr. was consumed by government buildings, shops, and lighting. The remainder was sold. Extensions were made to the electrical system during the past season.

The crater of Kilauea in the Hawaii National Park, established as national park territory in 1916. An observatory maintained by the U. S. Weather Bureau and the Volcano Research Association is located on the rim of this crater. Suggestions have been made to utilize the volcanic heat for power generation.

Gunsight Lake, a famous spot in the Glacier National Park. A new water and lighting system is contemplated for administration headquarters in this park, the electric lighting system to be operated from the motor which runs the pump. Two large modern hotels and seven chalets provide accommodation for visitors to the park, which is very popular throughout the summer.

In the Garden of the Gods, Colorado, the electric fan does its part in contributing to the comfort of guests enjoying the sunny vista from the "Hidden Inn."



An automatic electric cooking installation in Rocky Mountain National Park is a great convenience to the tourist. These electric plates are operated in the same way as a public telephone, by the insertion of a coin. A camper near here can be sure of a hot meal even if rain puts out his camp fire.

Power Generation in Mt. Rainier National Park

BY C. P. GORDON

(The number of people visiting the national playgrounds of the West increases year by year, and a growing demand is created for electric power to supply the various hotels and camps. Following is a description of a new installation by the superintendent of construction for Thompson & Castleton of Seattle, Washington.—The Editor.)

The Rainier National Park Company have greatly extended the size and accommodations of their hotels during the last year. Naturally the demand for electrical energy for lighting, heating and hot water heating has been increased, and last summer the company realized that they must increase their generating capacity. At that time Paradise Inn was supplied by a 2300-volt water wheel set on Van Trump Creek, and Longmire Hotel had a 220-volt direct current water wheel driven generator installed at the hotel on the Nisqually River.

Alpine meadows in Mount Rainier National Park. The number of people visiting this park in 1920 was 56,491, as compared with 15,000 five years previously. Considerable road building is contemplated to render the beauty spots more accessible. A new power plant and additions to hotels are among recent developments.

A site was chosen for a new modern hydroelectric development and a plant was built to care for the combined load of the two hotels. The generating station is located on the Paradise River about one-half mile above the junction of the Paradise and Nisqually Rivers, and is on the foot trail to Paradise Valley. From here the power is transmitted at 2300 volts a distance of approximately two and one-half miles to Longmire Springs, and four and one-quarter miles to Paradise Inn.

The dam, built on Paradise River, is 102 feet in length, 12 feet in height, and contains 120 cubic yards of concrete. The elevation of the spillway is 3719 feet. The pipe line is 4,406 feet in length; is wire wound, wood stave pipe, made by the American Wood Pipe Company, of Tacoma. Starting at the dam, the pipe is 24-inch diameter, reducing to 20-inch, then 18-inch where it enters the power house at elevation of point of impact on wheel 3213 feet, making a static head of 506 feet.

The Puget Sound Bridge & Dredging Company of Seattle were the general contractors on the job and they built the dam, pipe line and power house, but the electrical installation was designed and installed by Thompson & Castleton, Inc., of Seattle.

The power house is of wooden construction with concrete foundations for all machinery. Wooden construction was used to conform to the Park Company's general scheme of buildings.

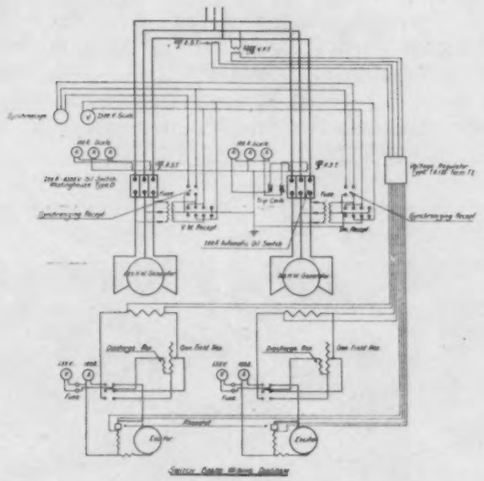
The generating equipment consists of two units. Unit No. 1 is an Allis-Chalmers set, consisting of a 500-hp., 600 r.p.m. impulse water wheel direct connected to a 400-kw., 2300-volt, 3-phase, 60-cycle generator. The exciter is carried on an extended shaft and is a 120-volt, 108-ampere compound wound machine.

Unit No. 2 consists of a new water wheel and an old generator. The generator is a 200-kw., 2300-volt, 3-phase, 60-cycle General Electric machine which had operated at the Rainier Park Company's old plant on Van Trump Creek. This generator was overhauled and connected to a 300-hp., 600 r.p.m. Harris type water wheel built by the Allan Cunningham Company of Seattle. This unit has a 120-volt, 74-ampere, compound wound Bullock exciter, belt-driven from the extended generator shaft. The generator is also equipped with an internal exciter winding, and this is so wired that it may be utilized for excitation in case of a breakdown of the regular belt exciter. The switchboard consists of two panels, one handling each unit, the instruments consisting of a voltmeter and ammeters only with a synchroscope for paralleling the machines, and a Tirrill regulator.

The present plans contemplate the installation of a bank of step-up transformers at the station and the operation of the transmission line at 6600 volts. When these transformers are installed two outgoing feeder panels will be added to the switchboard.

A 7½-kw., 2300/110-220-volt transformer furnishes power for local lighting and heating in the power house and operators' living quarters.

There are two transmission lines; one feeding Paradise Inn and the other serving the hotel and buildings at Longmire Springs. In both cases the



Wiring diagram of power plant, Mt. Rainier National Park

lines are carried on trees that have been topped and trimmed to make them suitable for use as poles. Medium hard drawn bare copper is used, the conductor to Paradise Inn being No. 3 B & S gauge, and to Longmire Springs No. 6 gauge wire. The lines are carried on standard 4-pin arms and No. 12 Locke 7500-volt insulators.

Each line is protected at both ends by lightning arresters and choke coils. Disconnecting switches are also provided at each end.

The secondary distribution is made at each hotel through a bank of transformers connected delta on the high tension side and star on the low side.

A 500-hp. unit in the new power house on Paradise River, Mount Rainier National Park. This installation was made to supply the growing demand of the summer resorts for electric power. The new plant cost $80,000.

Three-phase, four-wire secondary feeders are carried to the various distribution centers, and from these, single-phase circuits feed the lights, heaters and appliances.

This system gives 120 volts on the lighting and heating circuits, and also furnishes 3-phase, 220-volt power for the several motors that operate in and around the hotels.

The secondary distribution to the load centers is accomplished almost entirely at Paradise Inn by means of underground circuits run in conduit and at Longmire Springs by aerial spans.

Harspranget, a 250-ft. waterfall on the Arctic Circle, where the Swedish government will undertake the development of about 200,000 hp. in the near future.

DEVELOPING WATER POWER IN THE ARCTIC CIRCLE

BY A. ALIN

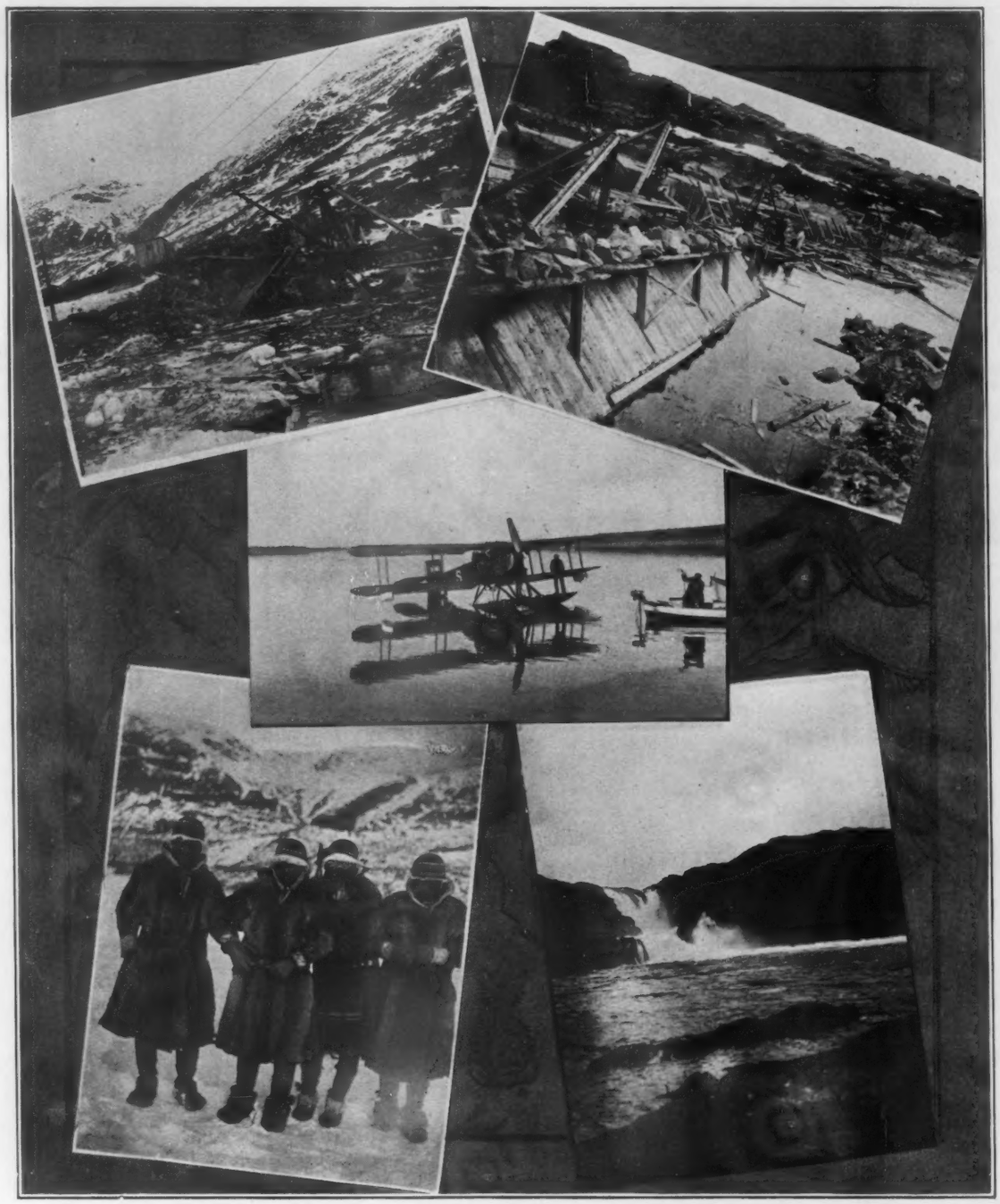
(That Western engineering practice is finding its way into the most remote corners of the earth is evidenced by this story from a member of the Royal Swedish Board of Waterfalls. A hydroelectric power development in the Arctic Circle is being worked out by the Swedish government along lines suggested by Western engineers.—The Editor.)

Far away in the north, above the Arctic Circle, the Swedish government is constructing two dams for regulating purposes, to obtain a larger supply of water for one of its great hydroelectric plants. The distance from the dams under construction to the nearest railroad is about 70 miles as the crow flies, and road-building is impossible over the rough intervening country. The transportation of materials is going on along a system of lakes, with land transportation on inclines to pass the rapids. It takes about three days to travel these seventy miles. The installation of telephone service is also impossible, and consequently, the only communication with the construction camp is kept up by wireless.

In order to facilitate transportation of smaller goods and members of the staff connected with the work, an airplane service has been established between the plant and the railroad. The flying started last summer with an English Rolls-Royce machine and an English army pilot. The service was maintained with one trip daily, and has been operating satisfactorily ever since the beginning in spite of climatic conditions which are often very severe. The plane is mounted on pontoons in the summer and on skis in the winter. Recently another machine of Avro type was bought from England, and another pilot employed to make the service still better. The flying route is very beautiful, extending into the heart of the Swedish Rockies.

The two dams now under construction are of the multiple-arch type, the design being the result of investigations made in the United States. The river profile for one of the dams is about the same as the Lake Eleanor dam of the Hetch-Hetchy project; the other is a little smaller. Suggestions offered by M. M. O'Shaughnessy and Lars Jorgensen of San Francisco were utilized in making up the designs.

For making preliminary surveys in the wilderness the airplane has been found to save both time and expense, and the Swedish government is making increasing use of it.



DEVELOPING WATER POWER IN THE ARCTIC CIRCLE

(Upper) Snorva dam site, showing temporary dam construction. (Center) The airplane at the dam site. Lieut.-Col. Henderson, the pilot, is standing to the left on the pontoons. (Lower left) Lapland women near the dam site. The Laplanders live in tents and use the reindeer for both food and clothing. (Lower right) A waterfall about 60 miles north of the Circle, and located in a national park.

Some New Ideas on the Lighting of Highways

BY C. D. WAGONER

(A distinct item in the safety-first movement, and one which ranks close to the campaign for better individual lighting, is the effort to illuminate highways in such a way that automobile accidents at night will be minimized. The following article gives some interesting figures on the subject, together with an account of a new lighting unit now being tried out.—The Editor.)

With an astounding percentage of automobile accidents credited to headlight glare—something the many types of reflectors and lenses do not entirely eliminate—a new plan for making the country highways as safe as the well lighted city streets will be welcome news to the thousands who use the highways.

A simple, economical way of so illuminating the highways that there will be no more need for the glaring lights on the country roads than on the city streets, is the solution of the problem offered by the General Electric Company, which has just completed a new type of incandescent lamp reflector after months of study and experiment by the company's illuminating engineers. A test installation has been made at Swampscott, Mass., which has fulfilled all pledges and predictions of the designers — a well lighted highway without a great waste of illumination on the adjoining fields.

An incandescent lamp of 250 candle power, placed in these reflectors at a height of 30 feet at distances from 400 to 600 feet apart, is all that is needed to illuminate the roadway so well that there is no need for the glaring headlights.

This new type of reflector, known as the parabolic nest highway lighting unit, embodies an entirely new and distinct feature for collecting the light rays and casting them only where needed. Engineers have spent years studying schemes to prevent the illumination of fields adjoining roadways and yet have a light that would illuminate the road adequately without glare. A nest of reflectors, or a series of three, one within the other, is the outstanding feature of the new unit. There are similar openings on either end and by this means the greater part of the light that would be lost under ordinary conditions by reflecting upward and out to the adjoining fields is collected and cast in either direction upon the road surface. The rays that would escape if only the one reflector was used are picked up by the inner reflectors and directed toward the roadway at an angle of 10 degrees below the horizontal, giving the same effect as an overhead reflector 15 feet in diameter. The white reflecting surfaces of the unit reduce the glare from the incandescent lamp without the aid of diffusing globes. The fixture also affords a much better projection to the globe than offered by the type of reflector now found on some highways on the outskirts of cities.

The bracket holding the reflectors is adjustable in both vertical and horizontal directions so that the fixture can be mounted on poles close to the edge of the highway or on others which may be back many feet, and can also be turned so as to illuminate curves and hillsides. In other words, the opening in the lower part of the reflector can be kept practically parallel to and in line with the road surface under any conditions.

A survey was recently made in the city of Cleveland of the 3540 traffic accidents that occurred during one year. This was done to show as far as possible how many of the 1059 accidents which occurred after dark would have been avoided if daylight or its equivalent had been available. It showed that 292 accidents, 14 of which were classed as fatal, were directly attributed to lack of light. This conclusion was reached by comparing the number of accidents during the hours of the night which are light in the summer and dark in the winter.

Night view of Paradise Road, Swampscott, looking west, showing 250-candlepower, 4-amp. series highway lighting fixture.

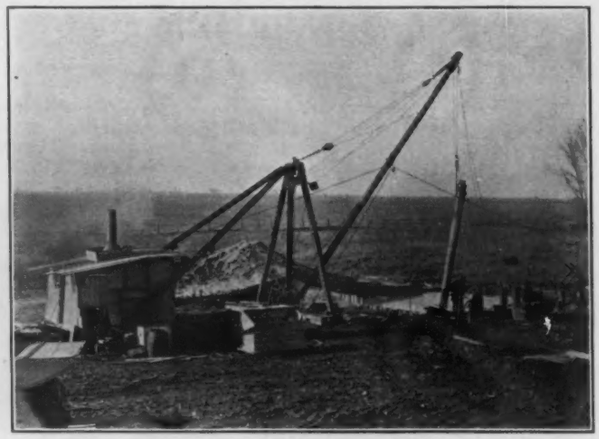
The condition in Cleveland is considered typical of those in other large cities, all tending to show the need for better illumination of the country highways.

Now that the problem appears to have been solved so far as illumination is concerned, there remains the question of apportioning the expense of the improvement. Farmers who own land adjoining the roads claim their benefit will be but small as compared to that enjoyed by autoists from all parts of the country. They feel that the installation should be made on the same basis as road improvements—since it is just as essential to traffic as a smooth road surface,—and that this is a job for the adjoining cities or the state highway departments. Several communities have already become interested and plan installations of the new lights for short distances.

DEMAND FOR MACHINERY IN INDIA

The greatest need of India today is machinery. India has already 2,000 mills and workshops working under the Factory Act of 1911. The greatest effort of the country today is not only to increase the cotton, jute and other old industries but also to start new manufacturing industries, such as oil pressing. To this purpose the national energy has been devoted. Within the last two years several big corporations have been started, including one for the pressing of vegetable oils.

Looking north along the ditch at the 300-ft. level. Steel pipes thirty-six inches in diameter will convey the water from the river to the ditch.



Driving piling for the foundation of the pumping station, which will house approximately 3000 hp. pumping equipment.

An Intermountain Irrigation Project

BY G. B. WALKER

(Reclaiming the desert for agriculture, industry and residence is not the least of the services which electric pumping is rendering to western communities. Following is an account of one of the extensive irrigation projects now under way in the intermountain region, which will bring water to 4,860 acres, and ultimately to 10,000 acres of some of the best land in Utah. The author is engineer with the Utah Power & Light Company.—The Editor.)

The first irrigation district to be organized and built under the Utah irrigation district laws of 1919 is about to become an active, wealth-producing reality.

Electric service from the Utah Power & Light Company's lines will furnish the "Push" to put the waste water from the "duck ponds" along the lower reaches of the Jordan river 300 feet up the side of the Wasatch mountains so as to give life to this irrigation enterprise—an enterprise that will add, it is conservatively estimated, at least $240,000 annually to the wealth of Davis county. It is an enterprise that will remove one of the uncertainties attendant on farming, and will place the required amount of water on each irrigator's farm at the time when it is needed. This project is organized, and will be operated electrically by the irrigators themselves.

A Promising Outlook

With 4860 acres of some of the best land in Utah under its canals, and approximately 5,000 additional acres that will probably be included later; with the enthusiasm for the formation of the irrigation district as shown by only 17 adverse votes out of a total of 4177, almost unanimous; with the size of the average farm under the project only 8 acres; with the favorable engineering reports furnished by the State Engineer's office after its searching investigation of the merits of the project; with an assessed valuation in the district, not including public utilities, of $1,750,000, which alone is nearly twice that asked by law to justify the bonds required; with the sale of $600,000 of bonds voted to build the enterprise guaranteed by the Anglo & London-Paris National Bank of San Francisco; with the actual construction work under the supervision of Mr. Oro McDermitt and in the hands of the Shattuck Construction Company, who have had wide experience in handling such projects, it has seemed to those interested in the further development of the agricultural resources of the state that the Bonneville irrigation district bears all the earmarks of a successful enterprise.

Water Sources

The district obtains its water from the easterly branch of the Jordan river about one mile west of the state road, and almost directly on the Salt Lake-Davis county boundary line. It is mostly return seepage, drainage and waste water from other irrigation projects that would otherwise be lost in Great Salt Lake. When the river is practically dry at Jordan Narrows there is reported to be from 150 to 200 cubic feet per second of water flowing past the diversion works of the Bonneville project, which, with its present boundaries, requires not more than 80 cubic feet per second. If due to any unforeseen contingencies, this supply of water should prove inadequate or would not supply the district's future requirements, a large amount of water directly from Utah Lake would be dropped down the Jordan river to the diversion works. From the river the water is led through an open canal 16 feet wide at the bottom and an average depth of 3.2 feet to the pumping plant, which will be located just west of the Denver & Rio Grande tracks and very close to the Salt Lake-Davis county line. With the aid of four large electrically operated pumps, the water is forced through two 36-inch diameter steel pipe lines 1300 feet and 1800 feet long, to ditches 150 feet and 300 feet vertical lift respectively, to canals on the side of the Wasatch mountains. The canals will be largely lined with concrete to prevent undue loss of water and will

deliver water to the diversion canals and the irrigators' headgates.

Extent and Costs of Project

This project is the largest single irrigation project, in point of horsepower required for its operation, on the company's lines in either Utah, Idaho or Colorado, and is being rushed to completion so that it may supply the late water requirements this year of the land under ditches, the early water requirements being furnished from the only gravity system. The contractors building the project are under bond to have it completed and in operation by July 15. The power company is under contract to deliver the power required to operate these large pumps by the same date. This project pumps water against approximately 20 per cent higher head than any other moderate or large size project supplied by the company.

Located right at Salt Lake City's front door and with the land wonderfully adapted to truck gardening and fruit growing, where as high as $1500 has been produced in one year from a single acre of ground, the landowners are in a position to pay, profitably for themselves, what might ordinarily be considered a high price for this water. Yet it is found that the first cost per acre for water under the project is very moderate, averaging $112.14, which is less than a number of the gravity ditch companies in Utah and Idaho charge for water.

The project can handle with very little additional expense, approximately 8,000 acres instead of the 4,860 acres at present embraced in the undertaking. This will reduce the average cost per acre to approximately $70, which is considerably lower than the majority of gravity canal companies feel they are justified in selling water. The operation, maintenance, depreciation and amortization charges for the first 20 years are estimated at approximately $10 per year per acre-foot of water allotted, or an average of about $20 per year per acre of land. This pays interest on and retires the bonds issued with which to build the plant. After the first 20 years, the operation, maintenance and depreciation charges are estimated at about $5 per year per acre-foot of water or $10 per year per acre of land.

Pumping Equipment and Power Supply

Approximately 2860 horsepower for the operation of the pumps, etc., will be obtained from the Utah Power & Light Company's 44,000-volt circuit which passes within a few hundred feet of the substation being built by the irrigation district. At the substation this energy will be reduced to 2300 volts, at which voltage it will be utilized by the motors operating the large pumps. There will be one 1200-hp., one 700-hp., one 600-hp., and one 350-hp. motor operating the large pumps, and one 5-hp. low voltage motor for operating sump and priming pump equipment. This latter equipment is supplied from an auxiliary bank of transformers which reduces the main bus voltage from 2300 to 110. During the non-irrigation months, this auxiliary service will be supplied directly from the 2300-volt distribution system.

All the pumping equipment, including sump and priming pumps, are directly connected to their motors. There will be one 15 cubic feet per second and one 25 cubic feet per second pump supplying the 150-foot ditch.

An idea of the quantities of water involved with all the above pumping equipment in operation can be obtained when it is realized that these pumps will deliver 25 per cent more water during one month than that required by the entire city of Salt Lake during its month of maximum water requirements.

Transforming the Desert

The building of the Bonneville irrigation district will work even a greater transformation than was enacted when the "Sand Ridge" south of Ogden was changed from a "desert" into one of the finest garden spots in Utah by the building of the Davis and Weber county canals and the Canyon Creek reservoir in Morgan county. But the change to be wrought by this irrigation district is in the south end of Davis county, just north of the Salt Lake City limits, where the soil is equally productive and still more valuable with the water than sand ridge land, on account of its close proximity to Salt Lake City and its beautiful sloping location—so suitable for residence purposes for people employed in Salt Lake City. Even with the present limited water supply good lucern, dry farming, grain and fruit are raised; and with an abundance of late water this locality will be converted into a real paradise.

INTERVIEW WITH W. B. GREELEY, CHIEF FORESTER OF THE U. S.

By a Representative of Journal of Electricity and Western Industry

In a recent interview with a representative of the Journal of Electricity and Western Industry, Col. W. B. Greeley, Chief Forester of the United States, spoke in no uncertain terms of the wonderful future of hydroelectric development in the West. In brief he stated:

COL. W. B. GREELEY

"I regard the water power law of 1920 as a great accomplishment. It embodies practically all of the good features of legislation necessary for the practical handling of the industrial and financial phases of this important work in our national civic and commercial life. In the years ahead we shall regard this enactment as the Magna Charta of water power development. I urge you men of the electrical industry to cooperate to the fullest extent with the federal authorities, and rest assured that the federal authorities will cooperate with you in seeing to it that the maximum use is made of the great undeveloped water power resources of the nation for the good of the people. We are at the beginning of a great era in electric power development. We have reached the limit of sawmill development in the East, and the great paper industry may be expected to arrive here on the Pacific Coast in the early future. We have in this country three times the use of timber in manufacture that prevails in France. There is no question, then, but that the future is bright for hydroelectric development in the West."

Talking Points on Stock Selling

BY R. I. CARRUTHERS

(The financing of the public utilities is one of the basic factors in industrial progress, and anything which draws the community into closer relationship with its power company is productive of mutual benefits. In the following article a member of the Southern California Edison Company recounts some of his experiences in stock selling.—The Editor.)

The essential qualifications for a stock salesman are, first, the ability to search out the man with money to invest, and to present the stock in a simple, intelligent manner so that the ordinary person can grasp the meaning in its entirety. The salesman must have a minute and detailed understanding of what the company is, of its aims and ideals, and he must also know the men of the company. He must believe that the work for which this money is used will be done correctly and efficiently. If he is in this frame of mind he will believe in the stock, and will be able to carry the message to his prospects, and convince them beyond any reasonable doubt of the value of the stock and the necessity of their buying it.

Here is a thought on which Mr. Edison lays great stress—the importance of observing and thinking. In it lies the human being's chance to distinguish himself from his fellows, for it is a sad fact that most of these two-legged creatures who surround you are not as dangerous competitors as you imagine. To excel them is not difficult. Almost any plain, ordinary fellow can jump away from the crowd if he will only stay on the job and keep thinking. What is your approach? Is it one of uncertainty and hesitancy caused by unfamiliarity of details and lack of confidence and spirit? It is my belief that your approach must be one of confidence, and determination so thoroughly to imbue your prospect with an idea of the genuineness and high class of the wares you have for sale that he will immediately fall in with your ways of thinking. I say a man should go so far as to show people the moral obligation of coming in on the security in order to insure progress and prosperity for the entire commonwealth. There never was a time in the history of the state of California when the progress and prosperity of the people depended more entirely on one commodity than it depends today on hydroelectric power.

The Self-Interest Argument

It is an accepted fact in the minds of people generally that the fuel oil situation is very serious. The cost of oil for fuel and the inability to obtain it, have made it prohibitive from a commercial standpoint for power purposes. There is only one source of supply that is left for people to use in their daily work. That is hydroelectric energy. When you say to a man that the thrift and prosperity which have been his during the last few years are based solely on the production of cheap electric energy; when you tell him that the only way to obtain this energy is to go into the high mountains, and spend enormous amounts of money that are almost impossible for the average mind to grasp; when you impress upon him the fact that this can only be accomplished by the close cooperation of everyone involved, and that every dollar he places in this stock brings three dollars of Eastern or foreign money into the state; that when this outside money does come to us, it brings as a natural result Eastern or outside people, who in turn bring additional industries that have in the past built up the Middle West, and before that, the East—all this makes the man approached realize that the cooperation needed to put over this development is more beneficial and of greater moment than any differences he harbors. The fact that the company is willing to take him in, divide its profits and give him a voice in the management of the business, showing him, of course, the greater earning power of this stock over funds placed in savings banks or mortgages on land, the flexibility of the security, the lack of worry in collecting his dividends or interest—these considerations place him in a position where he is ready to sign a stock certificate voluntarily.

Experiences in a Campaign

I will mention a few experiences that I have had in the open with consumers and the public at large. Before this present campaign was announced I had worked as I could every day spreading my propaganda to create an interest and demand for the stock, and I have experienced a number of cases where people tendered me money for stock that I had to refuse, telling them that we had no stock to sell at that time and that we would not have any until the campaign came on. This simply stimulated interest and passed from one person to another until we had a great number of prospects worked up to the point of enthusiasm, who were simply waiting for us to accept their money. We have not done any work in selling outside of our office, as we were anxious to see how many of our present stockholders would voluntarily exercise their options. When the announcement was made about the increase from $90 to $94, there was such a rush of people coming into the office that it resembled a Stock Exchange scramble. I happened to be in Hanford the day the campaign was announced, and called on a friend of mine who in former years was associated with our local company. The family desired 100 shares of stock at the stockholders' price, and when I told the man that it would only be possible for them to acquire one share of new stock for every two shares they then held, he said that as they were only entitled to fifty-five shares at that rate, that would be all they would take, as they did not care to pay the new price. I chided him for his lack of spirit and told him that he was a very poor partner, and that in fact as long as he had shown such an unprogressive attitude I was not sure that we wanted him for a partner at all. At that remark he turned to me and his answer was something like this: "—— ——, I won't buy your stock at that price, but if you

are bound and determined to sell stock at the new price, come on with me. I know a sucker over here that will buy." In about five minutes I had a subscription from this man that he took me to see, and his check for $2,068, with the prospect of selling thirty more shares within thirty days. If I had the time I would like to describe the establishment in which we found this buyer. If an expert stock salesman had been combing the town with a fine-tooth comb, this would have been the last place he would have entered expecting to find a stock prospect. The people that we most expect to have money for investment are the ones who turn us down most frequently. It is my opinion that it is the man with the small amount of money to invest that we should reach.

The Market Price

A San Francisco man who has interests near Visalia called to arrange for an extension to a pumping plant. He looked like money to me, and I found, after introducing our financial program, that he was an investor and a shrewd business man with international experience. He said, "Your talk is all right; your proposition is all right. The commonwealth must have the service, but I am not interested. I confine all of my investments to mortgages and bonds because of their security." However, he agreed to look over the stock prospectus I had given him and said he would advise me by letter as to his decision. In a few days I received a letter stating that he had found my quotation higher than the stock could be purchased for on the market, but suggested that we compromise between the market price and our selling price on a fifty-fifty basis. He explained that he made this offer because he believed the stock was all right and also for the purpose of encouraging me in my work. The inducement to me for accepting his proposition was that he would pay cash in full for the amount subscribed. This letter discouraged me and I felt that I had missed my opportunity. Determination forced me to answer his letter in the most courteous terms possible, accepting his statement that he could buy the stock on the market and explaining to him why the stock was sold on the market. I told him that if he should purchase on the market, the company would derive no benefit, as it was necessary in order to finance the company, to dispose of the treasury stock. I concluded my letter by enclosing a subscription blank filled out for fifty shares at the regular company price, and stated that I would be most pleased if he would sign on the dotted line and return to me, together with his check in full for the amount specified. Just a week later I received a reply enclosing subscription for fifty shares, and stating that though it seemed a little foolish to buy this stock at $89 when on the market it seems to be somewhat less, he was doing it wholly and solely on my account. He had no doubt of the value of the stock. This man has since been in for more stock, and has been the means of selling to other disinterested parties.

The Value of a Reputation for Courtesy

It is my belief that we should not insist on selling a large amount of stock to a person the first time; simply endeavor to consummate a sale, no matter of what proportions, in order that they may see the performance of the stock. The first purchase and the first dividend invariably bring them back for more, and it is the accumulation of these subscriptions, and the fact that we get so many consumers and outside people in as stockholders is going to be a means of eradicating all opposition and radicalism, which has at times proven to be a source of annoyance. The reason for criticism and opposition is not so much malice as a lack of understanding. The stock sale is the means to understanding and final satisfaction, which I consider the best asset a public utility can have.

Here is a good one. A clergyman of one of the leading churches called on me a few days ago and asked if he could buy some of the stock advertised. I told him that I would be glad to accept his subscription in any amount, and while the subscription blank was being filled out he said to me, "Do you know why I am anxious to make this investment?" I answered in the negative and then he said, "I like this company; I like the people that you have in the organization; they are always courteous and try to give service. I have come in here in the past few years from time to time and I have asked a good many questions, and even favors, and each time I left with satisfaction in my heart. That is why I want to be associated with your concern." After he had given me his check and signed the subscription he said, "I am going to recommend this investment to all the members of my congregation, and any time that I can be of any assistance, please call on me."

Catching Them Young

One more illustration of the possibilities in selling. A man called at the office about an extension and I suggested that we would like to have him for a partner in the business. He said, "You can't sell me. I have use for all of my money in my own business, but I will subscribe for one share on the instalment plant, for my little boy." He then went home and told the lad about his stock in the big public utility company. The lad, with boyish pride, acquired an incentive for saving his money and being thrifty. He bragged to his playmates that he was the owner of that big brick building on Main Street, that he received dividends and put all of his savings into Edison stock. The boy's friends became enthusiastic and some of them went to their parents and asked why they could not take the money they had in the savings bank and put it into stock, where it would make double the interest they were receiving at the bank.

These are a few of the high spots that I have seen from my own observation in selling and apapproaching the public, and I am sure that if all of us will put our shoulders to the wheel, become enthusiastic believers as we should be in what we represent, and carry the message to our homes, to our friends, and broadcast in every direction, we shall have laid a permanent foundation, and built up an organization which will guarantee our future financial requirements.

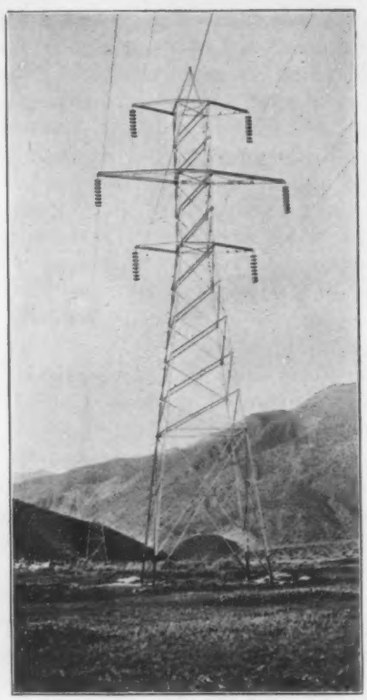
Longer Transmission Lines and Higher Voltages

BY H. MICHENER

(The West's lead in the field of long distance high voltage transmission has been maintained in spite of the plentiful supply of oil, which has tended to encourage steam generation of power. With the diminishing supply of oil, and its application to marine uses, hydroelectric development is made doubly necessary, as pointed out here by a member of the engineering department of the Southern California Edison Company.—The Editor.)

The West has led the world in long distance transmission of electric power since the beginning of the industry.

Just thirty years ago the transmission of a few kilowatts at 10,000 volts single-phase over a transmission line twenty-eight miles long was an achievement hitherto unattained. This power was used for lighting the city of Pomona. From this time forward, long distance transmission has developed by leaps and bounds, the West always being at least one jump in the lead.



The Yuma-Wonder line of the Southern Sierras Power Company, a section of which is shown above, holds the record for long-distance transmission, carrying power at 60,000 volts across a stretch of 536 miles of mountain and desert country in Arizona, California and Nevada.

In 1893 the first three-phase transmission system was put into service. It was our Western engineers who conceived this system, and forced the development of three-phase rather than two-phase or single-phase equipment. In doing this they laid the foundation upon which practically all the transmission systems of the world are built.

The length of transmission lines and their voltages were rapidly increased to 60 or 80 miles at 33,000 volts in the later 90's, 125 miles at 50,000 and 60,000 volts in 1904, 100,000 volts in 1908, 240 miles at 150,000 volts in 1913, and, as a bit of prophecy, 220,000 volts in 1923.

Why has long distance transmission been developed so extensively in the West? In the early years of its development, fuel was scarce and expensive, there being no deposits of coal close at hand, and the oil fields not having been developed. The country was being settled and power was needed. This combination made the lure of the mountain streams very strong. Their water was continually falling from higher to lower elevations without doing any useful work. They were a possible source of needed power, but the power could not be used near the place where it could be generated. These conditions made it necessary to transmit the power over long distances, and electric transmission was the solution of this problem.

The finding of oil in California provided a large supply of cheap fuel. This delayed the development of hydroelectric power, and hence of long distance transmission, to a considerable extent, for the reason that it was cheaper to build a steam plant and burn oil than to develop water power, except in the most favorable cases. In spite of this delay our Western states kept their lead in long distance transmission.

Then came the great increase in the use of oil of the last five years. The new oil burning merchant fleets, navies, railroads, factories, automobiles, trucks, tractors, power boats, and airplanes, must be supplied with fuel. The production of oil in the United States is increasing at about 25,000,000 bbls. per year, and apparently the consumption is increasing at a greater rate, since the reserves which existed two or three years ago have been practically exhausted.

These considerations lead to but one conclusion, namely, that it is economically wrong to burn oil for the generation of electricity when water power can be developed to take its place. In fact, the continued growth of the Western states depends upon the further development of their hydroelectric resources and of long distance high voltage transmission of this power to centers of population and consumption.

These are the problems before the power companies today, and the power companies' problems are the people's problems since their successful solution means the successful development of the West. And these problems are being solved successfully; the engineering problems by the power company engineers, and the equipment manufacturers; and the financial problems by the power company financiers, and by the people who appreciate more and more that the power companies are their servants who are there to give the best service consistent with cost, and who must be kept in a healthy financial condition in order that they may continue to give this service.

Economic Competition Between the West and East

BY J. W. BECKMAN

(The pioneer spirit that was responsible for the settlement of the West must be carried also into its industrial development, which cannot be modeled along Eastern lines. The questions involved in the industrial growth of the West—transportation, power, finance and confidence—are here analyzed by the president of the Beckman & Linden Engineering Corporation of San Francisco.—The Editor.)

The European nations have for many centuries been carrying on an incessant gathering of colonies. The very fact of this their hunger for new territory has brought about the creation of some of the greatest empires of today. It was only after the leading European nations had, to some extent, become industrialized that they consciously came to realize that these outlying territories constituted potential markets for products manufactured by the home country and also for products that the merchants of these countries were able to gather in their trading vessels from all parts of the globe. These miscellaneous products were often forced upon the residents or the natives of these colonies at prices that were agreeable only to the producers or merchants of the home country.

It was commercially, of course, of vital interest to the colonizing country to squash and discourage any undertaking fostered in the colony that in any way might reflect disadvantageously on the activities of the citizens in the old world.

The colonies have been and are primarily viewed as markets, but they have, in addition, another important function and that is the supplying of the manufacturing European centers with raw materials which, when passed through the mills there, giving work to the European population, will be returned again in manufactured form to the colonies to be purchased at a high price.

My discussing at some length this matter of colonies is due to a very strong feeling with me that we in the West have been, and to a considerable extent are still looked upon by the East, consciously or not, as a colonial empire with good, settled conditions, well supplied with gold and raw materials, and where goods sold will be paid for promptly. A simple example will show you what I have in mind.

What We Do with Our Copper

The largest copper consuming enterprises of this country are located in the West. In saying this, I am referring to the continually growing power developments here that need, for the transmission of this power, hundreds if not thousands of miles of electrolytically refined copper. This very copper is found in mountains over which these lines are stretched, and the crude copper is produced in smelters in the West; but the principal refining and drawing of the copper wire is done in the East, entailing the double hauling by rail of the copper across the continent—a total of some six thousand miles. The only reason for this is that the industries have been established there. We are, in other words, a submissive colony that accepts without further questioning conditions under which our raw materials and semi-finished products have to stand a freight haul to the East, where they are refined and manufactured, and then again stand a freight haul on the finished product to the point of consumption, which is out here. Cannot copper be refined as well here as in the East? We have electric power and chemicals as well here as in the East, and also mechanical skill. The largest United States markets, as stated, are located here, and we are also close to the largest potential markets for copper the world has ever heard of, the gradually awakening empires of the Orient and South America. Other examples of a similar nature can be quoted. For instance, the wool grown here goes East for treatment and is returned to us in the shape of woolen goods and clothing.

Dangerous Indifference

The colonial attitude of the East towards us, and our own complacency and acceptance of it, is and has been our industrial undoing.

A shrug of the shoulder with the words "What's the use?" is our mental attitude towards our industrial development. But such an attitude is dangerous, and we should under no circumstances permit it to be fostered or recognized.

We have been inoculated in a most subtle way with this harmful feeling, and with the idea that if we cannot do something industrial on a scale as large as it is done in the East, it is not worth doing at all. We should realize that we are living in and are surrounded by conditions supremely different from those existing in the East. Acknowledging this to be a fact, we have then to work out our industrial problems along completely different lines from the East. The sooner we do so the better off we will be; the more astonishing our growth.

The very first thing we have to do if we want to have an industrial future, is to abandon the feeling prevailing among us, that the East is our source of supply and this source of supply is some 3,000 miles distant. The result of this is, therefore, that goods brought out here cost the eastern price plus the freight charge. This charge is perfectly legitimate as long as the products cannot or are not produced here. It is, though, a most unfortunate idea that because our nearest competing source of supply is in the East, a surcharge should be made on manufactured and other articles equal to the freight charge between the East and here, even when these are developed or manufactured from local raw materials. Instead of this stunting policy, we should aim at holding the prices here as closely as possible to those of the East. In doing so, our living costs will be the same as those at other points, and it will result ultimately in increased trade and manufactures.

It was only a short time ago that I had a talk with a manufacturer who complained of this very fact. He has a plant out here, and stated that he could compete with the East from here as far as New Orleans, if he could be placed on the same basis as the East in the matter of raw materials, but the people with whom he was dealing saw only the immediate returns, while the ultimate good to themselves and the state they lived in was overlooked.

What we have to bear in mind primarily in this question of industrial development is that we are pioneers out here; that we are building for the future, and that our activities today should be such that we shall assure a prosperous outlook for generations that come after us. In other words, we have to be willing to look at things from an altruistic point of view.

I have been told, though I dare not vouch for the accuracy of this information, that during the past year the railroads of the United States collected from us, some 5,000,000 citizens on the Pacific Coast, thirty-two million dollars on only one commodity—iron and steel. In other words, the railroads took out of each of our pockets last year $6.40 just for bringing to us here of the products of the mills of the East.

The Iron and Steel Industry

Iron and steel manufacture is a basic industry; it is an industry that takes the raw materials out of the ground and produces a finished product. It would be a perfectly legitimate thing for us to be taxed $6.40 annually by the railroads if the only source of iron and steel were in the East, but I venture a guess that it is hard to find a district on the Pacific Coast that does not possess one, if not all, of the essential raw materials for the production of iron and steel.

The legitimate question is, then: Why is there no industry of this nature here? The answer is simple. The East and the railroads do not want to see it, and we have not enough local understanding to go ahead with this industry ourselves. Various attempts have been made, but they have always been patterned along well established Eastern precedents, and we might as well give up the thought of making pig iron and steel successfully along these lines. Our conditions are not those which prevail in the eastern iron manufacturing centers. We have conditions of our own and, consequently, our hope is along other lines.

Sweden's iron industry, world famous, is built up in surroundings much like our own, and consequently, if we want to establish an iron industry, we can well study the Swedish practice and build accordingly.

Iron ore, charcoal, and cheap electric power, together with suitable fluxes, are the raw materials, and an industry of this kind is bound, on account of its basic nature, to encourage the development of accessory industries, stimulated into a wholesome existence by the natural demands created.

A basic industry brings in population, and with an increased population there is an increased demand for agricultural products. Therefore, my belief is that to bring us up to maximum agricultural development, we also need healthy industrial development.

Cheap Power a Basic Need

The modern industry is dependent on cheap motive power, and such a power electrical energy has generally been considered. On the Pacific Coast we hold a very large percentage of the potential water powers of the country, and in view of this fact, we should have very cheap electric energy. Everything is relative. Cheap power to one may be 8 cents per kilowatt, while to another it may mean only a small fraction of a cent per kilowatt-hour. The basic industries that we need for our future healthy development can under no circumstances afford and expect to live, paying some of the prices now demanded from the consumer. The cheapest rate today that I am familiar with in California is .4 per kw-hr.

Sweden shows in a marked way the effects of industry controlling its own power source. About half the water power harnessed there is consumed by industries using the power in their manufactures. The remainder is distributed to small consumers through state-owned, municipally-owned developments and through power companies. Figures on this power production are as follows:

Power produced by the state costs	$0.0029 kw-hr.
Power produced by the municipality costs	0.0025 kw-hr.
Power produced by the power company costs	0.0047 kw-hr.
Power produced by the industry costs	0.0020 kw-hr.

The same conditions might prevail here, and have to prevail if we want to develop in all ways to our greatest possibilities. Heavy charges for motive force place a millstone around the neck of industrial development, and to some extent on agricultural growth.

Adapting the Development to the Conditions

There is always a temptation to over-develop industrially, in other words, bite off more than you can chew. The temptation out here is to stare into the East, the industrial sun of the United States, and think that we can build as they do and grow in the same proportion. Many failures in industrial attempts are due to this, while, if the same attempt had been made on a scale fitting the country and circumstances, it would have been a success. In other words, we have to be much more flexible in our developments; we have to be willing to bend the same hand to many jobs, watching the market developments of our products. Industries that can be successfully encouraged here are combination industries; a number of small industries under one roof, the size and growth of which would depend on the markets for the products. By combining in this way, the average cost of manufacture would be brought down as low as possible. This type of operation produces an industrial situation much more complex than that existing in the large markets, and is applicable only to small industries where small markets are at hand that need development.

To be successful in our industrial growth, we need men of the best training and men who stand with both feet on the ground. Too many so-called "gold bricks" have been passed out by the unscrupu-

lous to the credulous; too many industrial corpses are to be found in these parts due to visionary, most likely honest, but badly trained men. These attempts were often based on complete lack of fundamental knowledge, which if it had been applied, would have forbidden even the thought of starting such an industry. Therefore, we need men more than ever today with sound training, broad vision, and imagination to establish industrial confidence in the future.

We have dormant among us enormous, untouched fields of industrial possibilities. We have a huge agricultural production which is bound to grow, when more water is available, and when the country is fully inhabited. The agricultural waste and the economic handling of this waste into valuable products is an industry that is worth considering. Our timber resources yield annually an unheard-of amount of waste material, but today nothing is done with this. The economic recovery of by-products from this waste would create an industry holding far-reaching potentialities.

It is useless to try to enumerate here all the native possibilities that await us, and are bound to come to the front if we use the best of our brains and give our men the best of training, which I am fully convinced our universities are aiming to do. To a very great extent our industrial future is dependent on the training and viewpoints the students of today are obtaining, and great responsibility and opportunity rest with these universities.

Interdependence of East and West

I doubt whether we ever can expect, and I think it would be a vain and mistaken ambition to expect, to be industrially independent of the East. It cannot be done and I feel certain that in many ways we will be as closely dependent upon the East and its products as we are today. I encountered a startling example of this on a recent visit to the southern part of California. To a casual observer, it would seem a far cry between Niagara Falls water power and the successful growing of oranges in California. But such a connection exists. The successful growth of oranges is dependent on fumigation of the groves with hydrocyanic acid. Today this acid is produced in large quantities in liquid form and applied in this form to the trees. The raw material for the acid is a cyanide of calcium and sodium derived from calcium cyanamid, a product obtained by fixing atmospheric nitrogen to calcium carbide, an electric furnace product. The electric furnace producing the carbide depends on the falling waters in the Niagara River for its energy.

As buildings cannot be built of bricks alone, but need mortar with which to bind the bricks together into a strong structure, so industries cannot exist on possibilities and expectations. The mortar that binds the industrial structure together is money, gold in some form or other. Industries and undertakings are not started and maintained for the pleasure of so doing, but they have as an ultimate purpose the creating of greater values out of monies expended in their upbuilding. The hopes and prospects along these lines, mated with a legitimate desire to create new things, are the stimulus that creates the incentive for starting any industry.

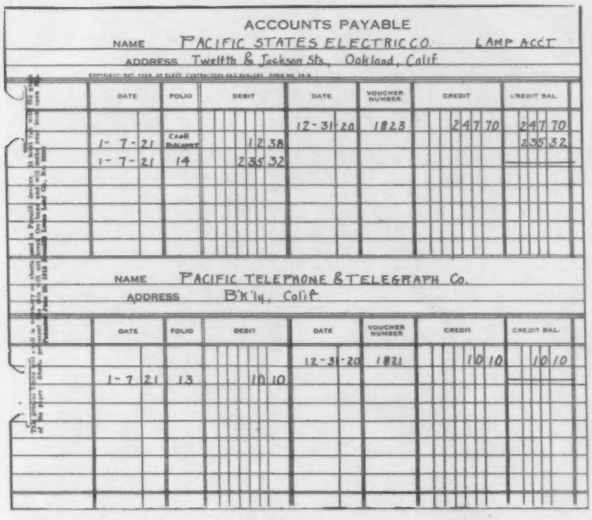
In spite of the fact that a very large percentage of the gold forming the federal gold reserve has been produced out here, we have always suffered in a most disturbing manner from the lack of local capital—capital that was on the ground, familiar with the local conditions. There is no shy maiden encountering new conditions that is shyer than capital away from its habitual haunts. New York being the financial center of the country, has therefore had to be appealed to for financial assistance for the development of the West, but the day is not far distant when the West will be able to finance the West; perhaps not completely, but sufficiently to dominate the situation. When this happens, the day of independence from the East has come, or the West has reached equality with the East.

The Engineer-Banker

The money of the West is in the hands of the bankers as custodians and it depends much upon their vision and foresight as well as courage how rapidly we develop industrially. Unfortunately, constructive bankers, in the widest sense of the word, are scarce. We might well remember that Germany's remarkable industrial development prior to the war was due to a very remarkable banking foresight. The Deutsche Bank, which I have had the pleasure of visiting, is indeed a constructive bank. In addition to the usual banking activities, it maintains a large staff of engineers and scientists and others whose whole object in life is to study, assist and develop any possible industries and undertakings in the German Empire. The commercial fixing of atmospheric nitrogen was encouraged and financed in its early stages by this banking institution, and finally, through the activities of the bank, was developed to one of the great industries of today. There are many other industries whose growth from babyhood has been nurtured by this banking institution. What is needed is an enlightened type of banker—may I call him an engineer-banker?—who will realize the possibilities in increased wealth to the bank as well as to the country it serves, by this combined application of banking and engineering in its widest sense.

In conclusion, may I say that we have to face west from here when we want a stimulus for our industrial pioneering. The anomalous term "far east" should be to us the "far west." There is where markets will be found for our excess products. Those markets are the largest potential markets in the world, and if you study some of the trade statistics for the last ten years or so, you will note their rapid growth. They are ours for the taking.

Be an optimist; nothing can be created or developed by means of a negative or neutral attitude, but at the same time optimism without balance is worse than none. And finally, have faith in your surroundings; learn to hear and see, and in doing so you will gain faith in yourself. For the sound and successful development of the West, we need men and women who hold high ideals and have faith in themselves.


ACCOUNTS PAYABLE

NAME PACIFIC STATES ELECTRIC CO. LAMP ACCT

ADDRESS Twelfth & Jackson Sts., Oakland, Calif.

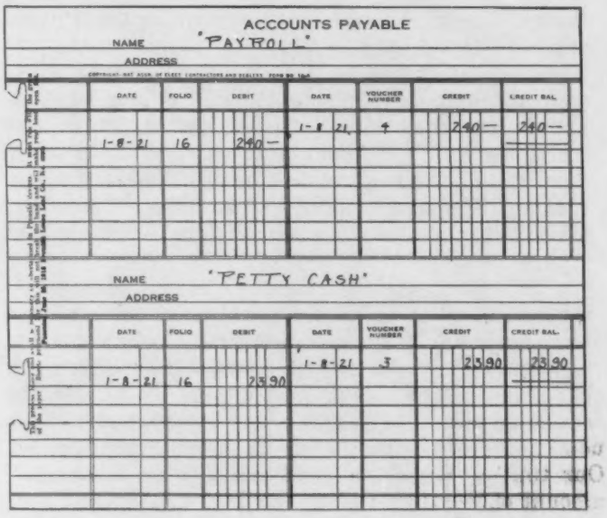
DATE	FOLIO	DEBIT	DATE	VOUCHER NUMBER	CREDIT	CREDIT BAL.
			12-31-20	1823	247 70	247 70
1-7-21	Cash Discount	12 38				235 32
1-7-21	14	235 32				

NAME PACIFIC TELEPHONE & TELEGRAPH CO.

ADDRESS B'k'ly, Calif.

DATE	FOLIO	DEBIT	DATE	VOUCHER NUMBER	CREDIT	CREDIT BAL.
			12-31-20	1821	10 10	10 10
1-7-21	13	10 10				

Form No. 16. Size 8 x 7. This is a page from the Accounts Payable ledger provided as part of the system. Note how this form serves as a summary and as an index to other papers.


ACCOUNTS PAYABLE

NAME "PAYROLL"

ADDRESS

DATE	FOLIO	DEBIT	DATE	VOUCHER NUMBER	CREDIT	CREDIT BAL.
1-8-21	16	240—	1-8-21	4	240—	240—

NAME "PETTY CASH"

ADDRESS

DATE	FOLIO	DEBIT	DATE	VOUCHER NUMBER	CREDIT	CREDIT BAL.
			1-8-21	3	25 90	25 90
1-8-21	16	25 90				

Form No. 16. Size 8 x 7. This illustrates how accounts with two such imaginary creditors serve as a summary and index to papers relating to such transaction.

A University Course in Practical Cost Accounting

BY PAUL B. KELLY

(Do you put postage stamps under "Miscellaneous" when you add up your monthly accounts? Is your "Petty Cash" a mysterious variable of which you have no itemized record? In the fifth article of the Standard Accounting series, the author explains how to systematize incoming and outgoing cash. This series is compiled by Mr. Paul B. Kelly, research accountant, under the supervision of Henry R. Hatfield, Professor of Accounting and Dean of the Faculties of the University of California.—The Editor.)

LESSON IV
GATHERING THE PRELIMINARY DATA

The Check Book, Petty Cash Fund, Bill File, and Accounts Payable Ledger

The greatest care should be, and usually is, exercised in accounting for the asset cash. Although in its ultimate analysis the best safeguard for cash is the accuracy and honesty of the employe, every precaution should be taken to prevent misappropriation of funds. The employer who, by his laxity in this respect, makes it easy to abstract his cash, is guilty of tempting his employe to a dishonest act. In this regard, one should reflect that it is only trusted employes who default, because they are the only ones who are ever given an opportunity.

Perhaps the best single device for promoting honesty and accuracy in the handling of cash consists in securing a double record of its receipt and disbursement. This double record can be easily obtained. One record of cash is kept by the concern; the bank can be made to keep another independent record of it. Any discrepancy in these two records is detected whenever the bank statement is checked with the cash account.

The bank will automatically keep the second record of the cash if the practice is adhered to of depositing in the bank all cash receipts, and of making disbursements by check only. The deposit of all cash received offers no difficulties. The disbursement of cash by check seems, however, to be open to practical objections. There are many small cash expenditures for which checks can not be written. Most concerns set a minimum below which they refuse to issue checks. To overcome this obstacle, and for the purpose of paying small amounts, a Petty Cash Fund is provided from which small disbursements are made in cash. This fund is, in the first place, created by a check on the general cash, and it is replenished by check from time to time. In this way the double record is made possible.

The petty cash fund is established by a check for an amount large enough to cover small expenditures for a week or two. Contractor-dealers will find that $25.00 is a fair amount for the petty cash fund. The check is cashed, and the money is kept in a special compartment of the cash drawer or safe entirely distinct from all other cash. The money set aside in this fund is an asset of the concern and is listed among the assets on its balance sheet. It is very similar to a sum of cash kept constantly in the safe for emergency purposes.

Small cash disbursements are thenceforth made by "borrowing" from the petty cash fund. When cash is taken from this fund a receipted bill, sales ticket, or memorandum for an equal amount should be put back in its place, so that at all times the amount of cash remaining in the fund added to all receipted bills and memoranda will equal the original amount of the fund. When the cash becomes almost exhausted and needs to be replenished a check is written, payable to "Petty Cash," for the total amount of the receipted bills. This check is cashed and the proceeds are placed in the petty cash fund,

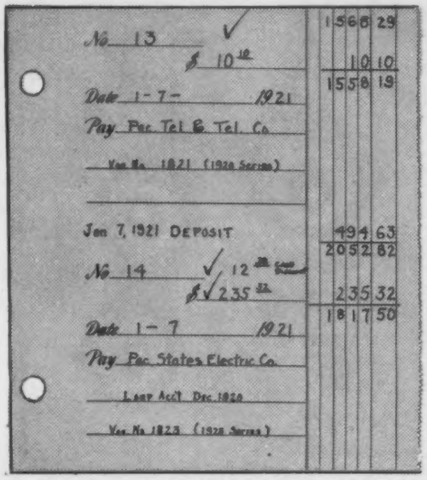
thus restoring it to its original condition. The receipted bills and memoranda are then removed, and sorted out into various classes of expenditures. A memorandum voucher is then made out as illustrated and explained a little later in this lesson. The petty cash fund has thus been repaid what was borrowed from it. The borrowing then begins anew. By this device even the small cash disbursements are recorded by check. This device is employed almost universally.

When a check is made out to "Petty Cash," or to the proprietor for a personal withdrawal, it is not necessary to take the check to the bank in order to have it cashed. Such a check may be cashed out of the till. It should then be deposited like any other check. At the bank it will be received as a deposit and be credited to the contractor-dealer's account; later it will be charged against his account as a withdrawal. The bank statement in this way is made to correspond exactly with the private record of the cash. The bank becomes the independent and disinterested auditor without additional trouble or cost.

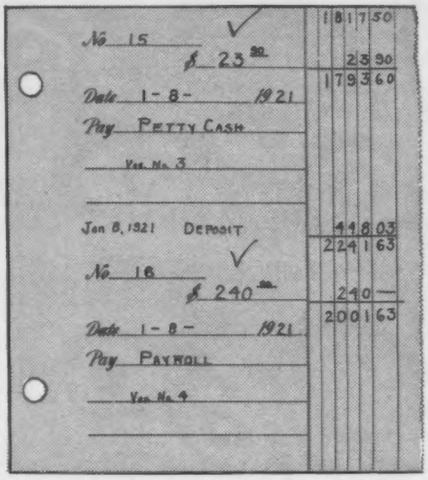
Recording Issue Checks on the Stubs

The check stubs serve as the original record of the checks issued. All checks should be numbered consecutively during the year. The check stub should be filled out carefully and completely as shown in the illustrations. The number of the bill or voucher for which the check was written should be noted on the check stub. After the cancelled checks have been returned by the bank and the bank statement has been compared with the cash account, the checks should be arranged numerically. The check numbers become the means of reference to the checks.

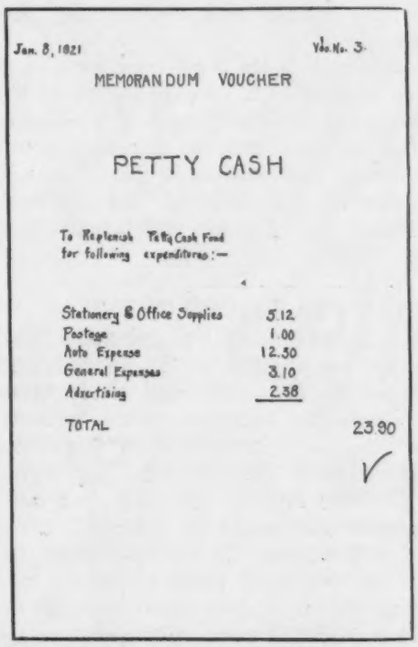
The cash balance should be carried forward on the stubs. Each deposit should be noted on the stubs, and the balance remaining after each check should be calculated as in the illustrations shown in this lesson.



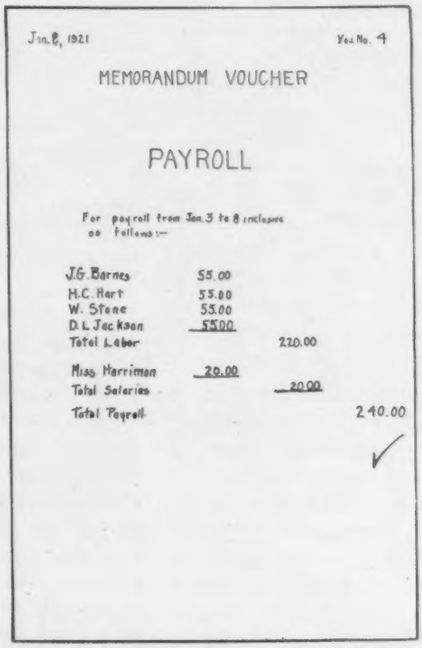
Check stub from book of the kind usually furnished by banks to business concerns. Note information listed on stub, and manner of carrying forward cash balance. Check marks indicate that these checks have been posted. See how this was done.



This illustrates the method of making out check stubs for checks which have been written for replenishing "Petty Cash," and for securing cash for payroll purposes. Trace these checks into the Accounts Payable ledger.



This is an illustration of a memorandum voucher for what was expended from Petty Cash. Note how it summarizes the purposes for which the money was spent. This data is used later on.



This is a memorandum voucher for the imaginary creditor "Payroll." Note how it gives details and shows the total charge for "labor" and for "salary." This data is used later.

The Accounts Payable Ledger and the Bill File

Every check, according to the plan of the Standard Accounting System, is entered in some account in the accounts payable ledger. The accounts payable ledger is a ledger in which are recorded all the debts that the contractor-dealer owes to other concerns. It is very similar in principle to the accounts receivable ledger, except that what it records are liabilities instead of assets. The advantages of having a ledger record with every creditor to whom money is paid are several. The ledger record serves as a condensed and convenient summary of the business done with each creditor. It is also a ready index to the checks that have been written and the bills that have been filed. Where numerous bills and payments are received and made during

the course of the business done with other concerns this ledger is practically a necessity. There are other advantages attaching to this system of recording bills and checks that will become evident later in the course.

When bills are received from trade creditors, they are numbered consecutively and are filed on a separate file which is called the "Bill File" or "Voucher File." Before being filed, however, they are posted to the accounts payable ledger. A check mark is placed upon the bill to indicate that it has been posted. This procedure is very similar to that used in filing and recording customers' bills explained in Lesson II.

In the accounts payable ledger an account is opened with every person or creditor to whom money is disbursed for any reason whatever. The account page should bear the creditor's name and exact address as shown in the illustration. Making and mailing checks will be facilitated if this rule is observed. Each bill or invoice should be posted to the "right hand" or "credit" side of the creditor's account. The date and amount of the bill, and the balance owed the creditor are entered in the columns provided. The number of the bill or invoice is placed in the column marked "Voucher Number." This serves as the means of reference to the voucher file.

The checks written and delivered should also be posted in the accounts payable ledger. The check stubs are used for this purpose. The checks are posted as shown in the illustrations. The check number is entered in the "Folio" column to provide a means of referring to the checks. A check mark should be placed on the check stub to indicate that it has been posted. Checks are always posted to the "left hand" or "debit" side of the account. The balance due the creditor should be shown after each transaction entered.

If numerous bills are received during the month from a concern such as a jobbing house, these bills should not be posted separately to the ledger. They should be assembled and checked against the monthly statement of account which the creditor sends. The total of such bills should then be posted. The monthly statement in this case should be given a number and filed on the voucher file. The amount posted to the ledger from the monthly statement should be carefully noted on the statement before it is filed. Study in detail the illustrations showing how these transactions are recorded. With a little practice it becomes simple and easy to follow.

Making Memorandum Bills

This system presumes that checks are written only in payment of debts recorded in the accounts payable ledger. It presumes that before a check is written a bill was received and entered in the ledger. Of course, in practice such is not the case. Many checks are written in payment of debts for which no bills have been or ever will be rendered. To overcome this difficulty and to make the system operate consistently, thereby securing a complete record, it is necessary in such instances to make a "memorandum" bill immediately after issuing the check. A memorandum bill can be made on any blank sheet of paper. It should bear the date, the name of the creditor, the amount and the explanation of the debt. An account should then be opened in the accounts payable ledger, and the memorandum bill after being numbered should be posted to it. It is then filed and treated in all respects as a genuine bill. When the check is posted to the ledger, the debt is cleared from the accounts. By this device a systematic and orderly record is maintained. It entails extremely little additional work, because in a short while an account will be opened with every person to whom cash is paid during the month. Subsequent entries involve less trouble.

This course is conducted in connection with the Extension Division of the University of California, the complete text appearing in these pages. Students of the course may obtain supplementary material by application to:

Extension Division,
Room 301 California Hall,
University of California,
Berkeley, Cal.

In a few instances, accounts will have to be carried with imaginary creditors such as "Petty Cash" and "Payroll." Such accounts involve no difficulties for they are treated as though they were real persons. Study the illustrations of the check stubs, memorandum vouchers, and accounts with "Petty Cash" and "Payroll." Practice soon makes this routine easy.

Note.—This lesson completes the first section of the course of lessons. The various forms used in securing the preliminary data necessary for a double-entry accounting system have been described. Their use is simple and easily understood. The work entailed in filling out these forms comprises most of the work of actually maintaining the Standard Accounting System.

The fifth lesson will begin the second section of the course, which is devoted to an explanation of the double-entry theory of bookkeeping and a detailed description of the use and function of each account kept by the Standard Accounting System. It will necessarily be somewhat theoretical and abstract, but it will be found not difficult and not uninteresting.

CANADIAN FLAX-FIBER TWINE

The Canadian Government has for some time been studying the possibilities of recovering and utilizing straw from flax grown for seed. In its more recent work it has sought to ascertain the value of the conclusions reached in previous investigations to discover some means of separating the flax straw without materially injuring the fiber and to obtain figures on the cost of converting the fiber into cordage, felt, and other products. The investigation included a comparison between matured straw and straw frozen before maturity. The conclusions drawn in regard to these qualities were that grain straw could not be decorticated, and that fully matured straw was slightly better than almost mature frozen straw for fiber production.

Problem Course in Electricity

BY H. H. BLISS

(Do you know any of the ways, other than irrigation pumping, in which electricity is applied to agriculture? The following article, concluding the nineteenth of the series, describes an electrical method of soil testing which is likely to be of value to the practical electrical man in an agricultural district. Answers to the problems will appear in the next issue as usual. The author is on the staff of the Riverside Junior College at Riverside, California.—The Editor.)

ELECTRIC BATTERIES

(Continued)

Soil Testing.—To determine the amount of "alkali" in certain western soils electrical tests are made of the resistance of small samples. A hard rubber cup with nickel electrodes built into its walls is filled with dirt fully saturated with water, and alternating current sent through it from an induction coil. Direct current was found unsatisfactory since it turned the cup and its contents into a miniature storage battery, of which the voltage interfered with the measuring current and so gave incorrect indications.

The "Wheatstone Bridge" illustrated in Fig. A is used to determine the resistance of the cup contents. The coil sends its alternating current through two parallel paths, one of them including the soil cup and a known resistance (say 50 ohms), and the other being simply a long piece of resistant wire, known as the "slide wire." A telephone receiver is connected as shown between intermediate points on the two parallel lines, the location of its sliding contact with the wire being varied until the buzzing sound dies out. The resistance in the cup is then figured as being the same fraction of 50 ohms as the length of part **a** of the wire is of part **b**. For example, if **a** is found to be 12 in. while **b** is 20 in., the cup has 12/20 of 50 ohms, or 30 ohms.

To check this result, assume that the slide wire has one ohm per inch and assume the voltage of the

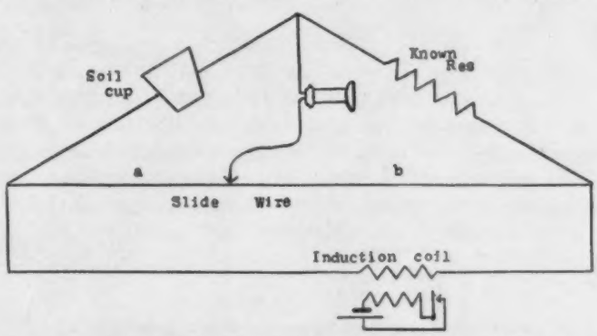


Fig. A.—The Wheatstone bridge in the form used for electrolytic testing of soils for alkali. When the sound in the telephone receiver is a minimum, the resistance in the soil cup has the same ratio to the known resistance that length **a** of the slide wire has to length **b**.

coil at some convenient figure, as 16 volts. Then the current through the upper line of Fig. A is $16/(30 + 50) = .2$ ampere; that through the slide wire is $16/(12 + 20) = .5$ ampere; the silence of the receiver shows that no current goes through it. The drop in voltage in the cup $= .2 \times 30 = 6$ volts; the drop in the 12 inches of slide wire is $.5 \times 12 = 6$ volts. Hence both ends of the telephone line are at the same potential and there is no tendency for current to go through it.

An identical check will be obtained if any other voltage is assumed and any other number of ohms per inch in the slide wire. Thus we "prove" (though not in a rigorous way) the fundamental proposition of the Wheatstone bridge that, when the instrument indicates zero current, **the upper left resistance is the same fraction of the upper right as the lower left is of the lower right.**

Solutions for Previous Problems

209. $850 \times 754 \times 2 = 1{,}282{,}000$ watt-hours, costing **$19.23.**

210. $8.7 \times 23.9 = 208$ ampere-hours. Then $208/72 =$ **2.89 amperes.**

211. Since 1728 cu. in. weigh $708 \times 16 = 11{,}320$ oz., $1728/11{,}320 =$ **.1526 cu. in. weigh one oz.** One ampere-hour deposits $.1361 \times .1526 =$ **.02078 cu. in.** The thickness would be $.02078/144 =$ **.000144 in.** This figure checks on the last column of the table. This illustrates the method used in calculating the figures in this column.

212. Generated volts $= 1.12 - .39 =$ **.73 volt.** Ampere-hours $= 20 \times 7.35 = 147$; $147/.3 =$ **490 hours.**

213. Drop in battery $= .3 \times 1.4 = .42$ volt; voltage at terminals $= .73 - .42 =$ **.31 volt.**

214. Ampere-hours $= 134.4$. Zinc used per cell $= 134.4 \times .043 = 5.78$ oz. In 40 cells: $40 \times 5.78/16 =$ **14.45 lbs.**

215. Drop $=$ .06 volt; $.06/45 =$ **.0013 ohm.**

216. Drop $= .0011 \times 45 = .05$ volt; $2.07 + .05 =$ **2.12 volts.**

217. At 45 amperes, drop $= 45 \times .0017 = .08$; $1.96 - .08 =$ **1.88 volts at terminals.** At 140 amperes, volts $=$ **1.72.**

Battery Problems

(Continued)

218. A certain Wheatstone bridge had 6 ohms as the upper left resistance and 2 as the upper right. The slide wire was 24 in. long and it had 20 ohms resistance. If the voltage used was 2 volts, find the currents in each line and the lengths of **a** and **b** when the bridge was "balanced" (no current through the instrument).

219. From a zinc-copper battery cell with sulphuric acid electrolyte a current of .15 ampere is taken by an external resistance of 1.866 ohms. Find the volts generated, terminal voltage and ohms in cell.

220. A voltage of 1.07 is generated in a certain type of Daniell cell which has 1.9 ohms of internal resistance. Forty such cells in series supply current to a resistance of 9.6 ohms. Find amperes and terminal voltage.

221. A battery of these cells is to be used to send .3 ampere through a line of 60 ohms resistance. How many cells are required?

222. Find the resistance of the soil cup in Fig. A if the known resistance is 10 ohms, **a** = 13 in., and **b** = 2 in. when the receiver is silent.

SPARKS—Current Facts, Figures and Fancy

(Is your baby up-to-date? If not, try the auto-perambulator. Cotton factories and wireless stations in China, water power in the Philippines, sugar machinery in India, and telephone experiments in England are among the subjects touched upon in the following items. There is also described a new invention which will polish your floors with less wear and tear on your carpet slippers.—The Editor.)

Two new cotton factories are about to be put into operation near Shanghai. The eleven Chinese owned and managed plants now located in Shanghai turned out 70,000,000 pounds of cotton yarn in 1919.

* * *

India devotes more acreage to sugar cane than any other country in the world. Special efforts are being made to modernize the entire Indian sugar industry by the introduction of scientific irrigation and up-to-date sugar machinery.

* * *

The oil production for the whole of the United States was 443,402,000 barrels during 1920, an increase of about 65,800,000 barrels over 1919. California's total of 105,721,186 barrels was 23.84% of the total production of the country.

* * *

In 1917 no city had a street railway fare higher than six cents. In 1919 twenty-five cities had introduced a ten-cent fare, twelve an eight-cent fare, and sixty-four a seven-cent fare. In 1920 the ranks of the ten-centers comprised fifty-seven cities.

* * *

There are 105,708,771 persons in the continental United States, according to the final report of the census bureau. The combined population of Alaska, Samoa, Hawaii, Panama Canal Zone, Porto Rico, the Philippines and the Virgin Islands raises this figure to 117,857,509.

* * *

Sixty per cent of the payroll of Oregon and Washington west of the Cascades is received from the lumber industry. Lumber and allied industries in this district employ on an average 90,000 men. Investment in the lumber industry is in the neighborhood of $400,000,000.

* * *

A recently perfected electric machine will, according to the inventor, polish waxed floors speedily and effectively. This will be welcomed by harassed elder sisters who have been wont to conscript the entire family to slide up and down in carpet slippers on the afternoon before a party.

* * *

The rivers of the Philippines offer an almost inexhaustible source of electric energy. Among the more important are the Agus River, which has 350,000 hp. available, Angat with 9,000 hp., and Agno with 60,000 hp. Manila is already well supplied with electric power, both for lighting and the operation of street railways.

According to recent figures the average person now uses more than twelve times the amount of electricity that he used eighteen years ago. About 1,400,000 persons now own stocks and bonds of electric companies, and more than $300,000,000 of public funds in the hands of insurance companies and $1,700,000,000 in bank funds is invested in public utility securities.

* * *

"Beating the train to the crossing" is a habit responsible for a startlingly large proportion of the automobile accidents. Of 1909 accidents at grade crossings on the Southern Pacific, 490, or more than 25 per cent, were caused by automobiles running into the train. In 122 instances crossing gates lowered to protect vehicles while the train was passing were run through and broken down.

* * *

Experiments are being carried on by the post office department in England to ascertain the value of a recently-invented telephone message recorder. If the subscriber is out of the room when the telephone bell rings, the message will be recorded on a cylinder, and the subscriber on his return can place the receiver to his ear, turn a switch allowing a needle to run over the record, and hear the message repeated.

* * *

A chain of wireless stations is to link Peking with Kashgar, 3,000 miles away in Chinese Turkestan. Kashgar will then be within reach of the wireless stations in India, and so with other countries. One high-power station has been equipped at Urga, 800 miles from Peking, and these two places are already in communication. Urga is also in touch with Shanghai and Hankow, and messages can be received from the long distance stations in America.

* * *

An auto-perambulator is the latest addition to the outfit of the up-to-date baby. The inventor, who is an English clergyman incidentally, has fitted an electric motor made from a self-starter taken from an automobile, to his children's perambulator. The motor is fed from a battery of accumulators. Large and heavy babies in cumbersome but comfortable perambulators may thus be handled by small sisters without strain. Although the mechanism is such that the vehicle will not exceed the speed limit, the baby is required to take out an automobile license. Progressive householders will no doubt arrange a special parking space for the convenience of visiting parents.

Letters to the Editor

WINNING THE PUBLIC

In regard to putting into practice the ideas in "Winning the Public," I wish to state that the ideas and ideals outlined in the book are in reality the aims and practices of Southern California Edison Company. There is nothing referred to or nothing suggested that has not actually been tried and found useful and advantageous. As to the method of getting our ideas over to the company's employes, you will of course understand that we have given this matter a close study for many years past, and in season and out of season we have preached and practiced the doctrine of "He profits most who serves best," using the word "service" in its broadest meaning, which includes not only the right delivery of the commodity supplied, but also the intercourse between the company and its consumers at every point of contact.

The Southern California Edison Company's system is entirely interconnected. There are now twenty-eight geographical districts, each district being under the control of a district manager and operating as a separate unit, the general supervision and general accounting only being done from the head offices. It has been the custom for some fifteen years past to hold bi-monthly meetings. The meetings are held in the general offices and are attended by the district managers, each manager bringing his principal assistant with him, and the department heads in the general offices with their chief assistants. Each of these meetings lasts an entire day and a regular program of papers and addresses is presented and discussed. At these meetings the policies and aims of the company are primarily set forth. The district managers are expected to hold monthly meetings, each in his own district, attended by all district employes. The aims and objects of the company are at these meetings set forth, explained and emphasized. By this means, what the management of the company has in mind in connection with its intercourse with consumers and other matters, percolates through the different grades until each man and woman in the company's employ is made aware of what is desired and what is required. These district meetings are frequently addressed by officials from the general offices, and of course this has a good effect in impressing the importance of the different subjects which may be under discussion.

It goes without saying that in order to reach a high standard in this question of intercourse with consumers and the public, the management of the company must keep everlastingly at it, not only because of the new employes who are constantly entering the ranks, but also to keep the older employes up to the mark, until such time as they themselves understand the full meaning of high grade service and become personally enthusiastic about it. I may state that in our company we have many men in all ranks who are now filled with this important subject and who lose no opportunity to encourage the employes working under them and around them to do everything possible to please consumers, placate the public and raise the standard of service to the highest plane.

As to the general results, I have no hesitation in saying that Southern California Edison Company has its customers and the general public with it in a very high degree. We have demonstrated this in many ways, but I will draw your attention to the three principal items.

First, in times of stress during the recent years, when the country was at war, there was not an oversupply of power and certain restrictions were put upon us in regard to the amount of energy supplied to different classes of service. After the war there was a power shortage and again restrictions were placed upon some classes of consumers. We found invariably that when the matter was explained to our consumers, either in the public press or by other means, we had complete cooperation from those who were taking our service and everything was done to assist the company under the emergency conditions.

In the second place, when the subject of increased rates and surcharges was up before the public utility commission of the state, the company had practically no opposition. Nothing in my twenty years' experience in the public utility business has surprised me more than the fact that the company's customers as a whole practically made no objection to the increases asked for, but paid these increases cheerfully when the bills were presented.

The third angle to this subject, which I believe is highly complimentary to the company, is the question of customer ownership. The Southern California Edison Company has approximately 10,000 shareholders; 2,000 of these are employes of the company and 8,000 are the company's customers. The enthusiasm displayed by the company's customers and the public in purchasing the stock when offered, and the confidence displayed in the company as to the safety of the investment and the surety of dividends is something to be proud of. As a matter of fact, the company aims to make a large percentage of its customers partners in the business and every customer stockholder, whether he owns one hundred shares or one share, gives strength and stability to the organization and has a tremendous effect in producing good will and influencing public opinion.

Very truly yours,

S. M. KENNEDY, Vice-President,
Southern California Edison Company.

GROUNDING TELEPHONE STATIONS TO WATER MAINS

Journal of Electricity:

Some discussion has been started here regarding the practice of telephone companies grounding their subscribers' stations to the water mains, the contention being that electrolytic action detrimental to the water piping is set up.

Will you please advise me of your opinion regarding this, or refer me to some source of information on the subject?

I am a subscriber to the Journal of Electricity and Western Industry and have often thought that a question and answer department would be an advantageous feature.

Yours very truly,

JOHN F. KRYDER,
City Electrician, Fullerton, Cal.

Editor, Journal of Electricity:

In answer to the inquiry concerning the possibility of electrolysis arising from the practice of connecting telephone substation grounds to water pipes, it can be stated positively that there is no danger involved. The ground wire is employed (1) to provide protection, being connected to the ground side of the open-space protectors, and separated from the line-wires by air gaps, and (2) to provide a path for ringing current or other signaling impulses from one line wire to ground.

In these cases the circuit to ground is either through a condenser, which prevents the flow of direct current, or is open except for the brief intervals during which the signals are being given.

Very truly yours,

D. I. CONE, Chief Engineer,
Pacific Telephone & Telegraph Co., San Francisco.

Builders of the West—C

STEPHEN T. MATHER

Director of the Bureau of National Parks, who has been the leading spirit in the development of one of the West's greatest assets, the national parks.

ON the one hand, the story of Stephen Mather's life is to be told by the historic events of his birth in San Francisco on the fourth of July, 1867, his years in the San Francisco schools, his graduation from the University of California with the class of '87, and his subsequent business career. To this series of events belong the five years of service from 1887 to 1893 as reporter on the New York Sun and his association with the Pacific Borax Company for the next ten years, the greater part of the time as manager of the Chicago office of the firm. It was he who realized the advantage of a distinctive package for the product and coined the popular phrase of "Twenty Mule Borax Team" under which the company became famous. In 1903 he went into the borax business for himself, becoming president of the Thorkildsen-Mather Borax Company, with a mine near Saugus, California, and headquarters in Chicago. This venture marked prosperity in a material way—and completes the data necessary to sum up this side of his life. He is still in the borax business and still prosperous. From the standpoint of prosperity, however, it is much more important to record that very early in his career he became a lover of the California mountains, familiar with trails and burros from one end of the Sierras to the other. Even when his business interests kept him in the level country of the middle west, he would manage to get away for the summers for a few weeks of fishing and mountain stars. Mr. Mather being one whose convictions usually find expression in action, it is not surprising to find him accepting the position of Assistant to the Secretary of the Interior in 1915, with special charge of the National Parks. In 1917, under his inspiration, the Bureau of National Parks was formed—and Stephen Mather became its first director—a position he still holds.

Since the date of his taking them over, the parks have had a tremendous development. Their origin and growth were along most haphazard lines until a few years ago. The first park was created by an act of Congress in 1832, and from that time up to 1915 at thirty-year intervals, some twelve or thirteen areas have been added to the park system. There was no special supervision of these areas. Each park had its own control and its own set of regulations under which it was operated. Whatever action had to be taken from the Washington office was handled by whatever clerk happened to be free for the moment. There were no appropriations from Congress. Under Mr. Mather's direction the park system has been put on a business basis. A small but efficient bureau—it is said to be the most efficient in Washington—has been built up to supervise and coordinate the work of all the parks; Hawaii, Mt. McKinley, the Rocky Mountain wonderland and the Grand Canyon have been added among others to the nation's permanent possessions; the appropriations from Congress have increased from $300,000 to over a million and a half; park facilities have been enormously improved, and—proof of the value of the results accomplished—the number of visitors who enjoyed these national playgrounds has increased from something like 200,000 in 1915 to well over a million during 1920.

Aside from the time devoted to the regular duties of his office—for a long time at a salary which placed the position in the dollar-a-year class—Mr. Mather has given generously of his own resources in furthering this development. At his own expense he secured the deserted Tioga Road that led into the heart of the high Sierras and presented it to the government. He has purchased thousands of acres within the park boundaries which have hitherto been held by private interests and turned these over to the public. He has each year conducted camping parties through some one or other of the national parks, introducing congressmen, editors and other men of public importance to the glories and the possibilities in these national assets. He is very modest in his giving, as in his numerous charities along other lines, and more often than not, his gift has been disguised and unlabeled in a group of smaller gifts which his generosity has inspired.

His attitude has always been a most friendly one toward the development of the national resources of the country—indeed, he recognizes the development of national water powers as a type of conservation in the same class with the preservation of the special beauties of the national parks—a development in the interest of future generations.

To him more than to any other man may be credited the present awakened and appreciative attitude of the nation toward the national parks—to him certainly is due the highly efficient and far-sighted administration of these parks today. To Stephen T. Mather, therefore, as a builder of the West in the truest sense and in appreciation of his great services in the public interest, this issue of Journal of Electricity and Western Industry is affectionately dedicated.

PERSONALS

E. F. Whitney, manager, lumber industries department of the General Electric Company, at Portland, and chairman of the Portland Section of the American Institute of Electrical Engineers, is striving to make the local section second to none in quality of meetings and service to its members. He graduated from Boston Tech. in 1907, and after taking the G. E. test course spent two years in the San Francisco office of the General Electric Company. He then spent some time in the Seattle office, and was later transferred to the Portland office of the same company where he remained until 1917, when he was made a captain in the United States Army, 29th Engineers, specializing on flash and sound ranging work. In 1919 he returned to Portland to become manager, lumber industries department, of the General Electric Company, and since his return has been devoting his time to the engineering problems in connection with the electrification of the lumber industry in the Northwest, in which line he is the recognized authority on the Coast. Mr. Whitney was in part responsible for the success of the Pacific Coast Convention of the American Institute of Electrical Engineers held in Portland last July and was the able representative of the Portland Section at the last national convention of the Institute.

Fred A. Anderson, formerly electric welding engineer in San Francisco for the United States Shipping Board, is now sales engineer with the Safety Electric Company.

Dawson J. Burns, vice-president and sales manager of the Ward Leonard Electric Company, with headquarters at Mt. Vernon, New York, is a recent San Francisco visitor.

Dan W. Freeman has been appointed manager of the Associated Industries of Oregon to succeed **A. G. Clark,** who recently resigned to go into the automobile business in Bend.

J. N. van der Ley, mechanical and electrical engineer and superintendent of the government service for water power and electricity in the Netherlands East India, is a business visitor in San Francisco.

E. S. Turner, of the engineering department of the Pacific Power & Light Company at Portland, has resigned to associate himself with his father in business. **L. L. Everhart** will assume Mr. Turner's duties.

F. Muehlenbruch, of the North Coast Electric Company, Tacoma, and **Clarence Shank** of the Electric Construction Company, Tacoma, have been selected as representatives of the electrical industry in the recently organized Tacoma chapter of the 100% Club.

B. F. Pearson, formerly superintendent of the Southern Division of the Southern California Edison Company, has been appointed manager of operations of the entire company. **F. B. Lewis,** formerly superintendent of the Los Angeles district and operating engineer, has been appointed manager of operations.

F. C. Knapp, president of the Peninsula Lumber Company of Portland, is a member of the national committee which met in Atlantic City April 27-29, under the auspices of the Chamber of Commerce of the United States, to study the forestry situation with a view to suggesting a national forest policy. Timber owners, lumber users, foresters and the public are represented on the committee.

Douglass Wood, formerly district representative for the Bryan-Marsh Division of the National Lamp Works of General Electric Company, has been promoted and is now manager of the Colonial Electric Division, National Lamp Works of General Electric Company at Warren, Ohio. Mr. Wood replaces **A. E. Williams,** resigned.

Ralph E. Emerson, of Hoquiam, Wash., representing the West Coast Lumbermen's Association, and **Charles E. Hill,** secretary of the Douglas Fir Exploitation & Export Company, represented the lumber industry of the Northwest on the excursion conducted to Oriental ports on the steamship "Wenatchee" which sailed from Seattle recently.

George W. Curtiss, sales manager for the Electric Railway & Manufacturers' Supply Company, is in the East on a seven weeks' business trip. While there he will act as a delegate for the Pacific Division of the Electrical Supply Jobbers' Association at the annual convention being held at Hot Springs, Virginia, and will attend the Westinghouse jobbers' convention being held at the same place.

H. H. Corely, public service commissioner of Oregon, recently attended a meeting of the Idaho Public Service Commission at Boise, which body is investigating the valuation of the Idaho Power Company, which has applied for a rate increase. The value of the company's property is said to be about $20,000,000. The Oregon Commission is interested for the reason that the company supplies power service in Baker and Malhuer counties of that state.

R. W. Clark, chairman of the Advisory Committee of the Northwest Electric Service League; **George E. Quinan,** chief electrical engineer, Puget Sound Power and Light Company; **J. B. Fisken,** consulting engineer of the Washington Water Power Company; and **W. M. Shepherd,** general manager, California-Oregon Power Company, met recently in Portland, Oregon, with members of local power companies to discuss the subject of power line extension service throughout the Northwest.

P. M. Hatch, recently appointed superintendent of light and power for the El Paso Electric Company, has had a varied experience in the electrical industry. Mr. Hatch was born in Boston in 1888 and was graduated from Tufts College in 1910. His first position was as an apprentice with the Trinidad Electric Company, at Port of Spain, Trinidad, British West Indies; in 1911 he was made chief engineer and had charge of maintenance for the company. In 1912 he returned to the States as chief clerk to the master mechanic and transmission superintendent of the Savannah Electric Company at Savannah, Ga. Later, with the engineering department. The Ponce Railway Light Co. of Ponce, Porto Rico, was in need of a general superintendent and Mr. Hatch accepted the position in December, 1914, and in 1916 was made manager. In December, 1917, he entered the army as first lieutenant in the ordnance department. After being discharged in 1919 followed a short period of statistical work in New York, and then a position in the office of the manager of the Southeastern District of Stone & Webster, Inc., at Savannah, Ga. From this position he was transferred to El Paso, taking the place of J. L. Alexander, who was transferred to Keokuk, Iowa, as manager of the Keokuk Electric Company.

B. N. Wilson, professor of experimental engineering at the University of Arkansas, is to head the work in mechanical and electrical engineering at the summer session of the University of California, June 20 to July 30. It will be of unusual interest to men of industry and engineering in the West to know that courses are contemplated in the near future along the lines of industrial management, industrial cost keeping and other features of vital importance to industry throughout the West, and Professor Wilson's acquisition to western university work means much toward the formulating of helpful vision in these lines of endeavor.

J. B. Campbell, of Spokane, has been appointed a member of the Interstate Commerce Commission.

H. W. Cooper, formerly district manager of the Pacific Power & Light Company at Pomeroy, Ore., has been transferred to Dayton to succeed R. B. Bragg.

G. E. Armstrong, Pacific Coast editor of the Electrical World, has returned from a nine weeks' trip through the Southwest and the Intermountain districts.

H. H. Blood, who has been a member of the Public Utilities Commission of Utah since it was organized, has retired from that body, his term having expired.

Robert Johnson, for four years representative of the Federal Electric Company in Salt Lake City, has been transferred to Oakland, Cal., as sales manager of that district.

R. B. Bragg, formerly district manager of the Pacific Power & Light Company at Dayton, Ore., has been transferred to the Pasco (Wash.) office. Mr. Bragg succeeds Mr. Safford.

Malcolm F. Herring has been engaged as successor to Edgar Kobak as representative in St. Louis for Journal of Electricity and Western Industry, Electrical World and Electrical Merchandising.

Robert Sibley, editor of Journal of Electricity and Western Industry, has returned from the Northwest where he attended the merchandising conferences held in Spokane, Seattle and Portland.

H. M. Cooper, manager, Drum Division of the Pacific Gas & Electric Company with headquarters at Auburn, spent several days in San Francisco recently attending the conference of division managers.

H. Foster Bain has been appointed Director of the United States Bureau of Mines. Mr. Bain is well known to the mining men of the West and was at one time editor of the Mining and Scientific Press.

O. C. Leiter and **Morgan J. Quill** have opened offices in the Dekum Building, Portland, Ore., under the firm name of Leiter & Co. This company will handle investment securities, specializing in the securities of Oregon concerns.

Harry E. Marshall has been appointed Pacific Coast representative of the Mueller Electric Company of Cleveland, Ohio, manufacturer of Universal battery and test clips, with offices and warehouse at 332 Leavenworth Street, San Francisco.

Thomas C. Sias has been appointed sales manager for the Safety Electric Products Company of Los Angeles. Mr. Sias was formerly New England representative for the National Metal Molding Company, Hart & Hegeman, and other electrical manufacturers.

E. R. Davis, formerly superintendent of the Northern Division of the Southern California Edison Company, has been appointed construction engineer and will devote his entire time to the engineering features of new construction work.

James H. Mills, of Great Falls, was elected president of the Montana State Association of Contractors and Dealers at the convention held in Butte, April 19-21. **Ernest Shelley**, of Livingston, was elected vice-president, and **Frank R. Venable**, of Butte, secretary-treasurer.

Abbott R. Heywood, formerly mayor of Ogden and recently appointed member of the Public Utilities Commission of Utah, to succeed H. H. Blood, has been elected president of the commission. Mr. Heywood came to Utah in 1876. Since that time he has been a prominent figure in the history of the state of Utah. He practiced law until a few years ago, since which time he has been engaged in banking and public service.

Guido Semenza, **Giacomo Ponti**, **Ferdinano Cusani** and **M. DeRegibus** form the commission on railway electrification of the Italian American Electric Company, of which Prof. Semenza is chairman, that is making an extended trip through the United States and Canada studying railway electrification. From June 9th to 16th the commission will inspect the Milwaukee and B. A. & P. electrification and will proceed to Seattle, Portland, San Francisco and Los Angeles to investigate interurban electrification, leaving Los Angeles June 26th for Salt Lake City and the East. Prof. Ponti is comptroller and F. Cusani is manager of the Italian American Electric Company, and M. DeRegibus is assistant chief engineer, Electric Traction Service of the Italian State Railways.

OBITUARY

W. A. Lynn, consulting electrical engineer for the United States Government with headquarters at Mare Island, California, passed away during the last fortnightly period after an operation in one of the hospitals of the San Francisco Bay region. Mr. Lynn was born at Salinas, California, on October 5, 1873. He graduated from University of California with the class of 1897, and for a number of years after that was an instructor at the university, and during this period he was widely known and beloved by students of the University of California. Since graduation he had a wide experience in many of the engineering activities of the West, and for the last several years was located at Mare Island where he did important work in research for the government. As a consulting engineer, both for the United States Government and in private practice, his work was of great value, and in his passing the West experiences an irretrievable loss.

Arthur C. Keyes, western traffic manager for the Chicago & Great Western Railroad Company, stationed in Tacoma, died recently at the age of sixty years. During the war he was special traffic inspector for the federal government, with headquarters at Minneapolis.

William Williard Warren, general manager of the Snoqualmie Falls Lumber Company, dropped dead of heart failure in his office in the White Building in Seattle recently. Mr. Warren had been suffering from the effects of a severe attack of influenza several years, and had just returned from a long stay in the south.

Business Activities in Western Market Centers

GENERAL BUSINESS CONDITIONS

Retail Trade

Report of the Twelfth Federal Reserve Bank concerning retail and wholesale trade in the West follows:

In March, 1921, net sales of twenty-eight representative department stores (exclusive of mail order houses) in this district averaged six-tenths of one per cent greater than in March, 1920, although 15 of the stores reported their sales less in value in March of this year than in March, 1920. Sales for the first three months of this year were 1.6 per cent greater in value than for a corresponding period a year ago.

The average net increase or decrease (—) in the value of net sales for the reporting cities is as follows:

March, 1921, compared with:	March, 1920	February, 1921
Los Angeles	9.9	18.2
San Francisco	— 3.1	24.6
Sacramento	— 6.2	.....
Oakland	.9	26.6
Seattle	—14.6	33.4
Spokane	4.6	19.4
Salt Lake City	1.7	25.1

The average sale (cash, charge and C. O. D.) reported by ten firms fell from $3.14 in March a year ago to $3.01 during March this year. The average sale in March of this year, however, was 7.5 per cent larger than that in February, 1921, when it was $2.80.

Collections during March were reported as "good" by twelve of the reporting firms, "excellent" by one, "fair" by six and "poor" by one firm. Similar reports were received in January and February, indicating that there has been little change in collections during the present year.

Prices of goods sold by department stores are reported from 20 to 33 per cent less than at this time a year ago although the percentages are not uniform in all classes of goods sold. It is stated that goods temporarily "in style" and for which, consequently, a sharp and concentrated demand exists, have not declined as have other articles. Among goods mentioned in this class are taffetas, tricotines and twills. The following table gives in detail the statistics in regard to sales, stocks and outstanding orders which were supplied by twenty-eight representative department stores in March.

Wholesale Trade Report

Reports received from 149 representative wholesale firms in eight lines of business in this district show that sales are less than those of last year by percentages ranging between 7.3 per cent in groceries to 47.4 per cent in automobile tires.

The average net increase or decrease in the value of net sales for the eight reporting lines of business was as follows:

March, 1921, compared to:	March, 1920	February, 1921
Hardware	—33.6	33.9
Groceries	— 7.3	20.9
Dry Goods	—29.1	28.5
Drugs	—10.4	14.3
Shoes	—16.0	68.4
Stationery	— 9.7	1.3
Furniture	—30.6	19.7
Automobile Tires	—47.4	46.7

Various price indices show that wholesale prices are approximately 40 per cent lower than they were a year ago, so that the volume of actual transactions in the wholesale trade generally is probably not less than it was last year at this time.

Retailers of this district are still buying conservatively and to meet current needs only. Reports from wholesalers in all lines are to the effect that the volume of orders for spring and summer deliveries is much smaller than it was last year, the reason alleged being a general lack of confidence in the stability of present price levels.

Present prices when compared with prices a year ago are lower than in all reporting lines excepting stationery and furniture where the trend is not defined. It is a noticeable fact that prices during the month were firmer than they have been for some time past in all lines, excepting hardware and stationery, in which a majority of the operating wholesalers indicated price reductions. Collections were reported "excellent" by 11 of the reporting firms, "good" by 43, "fair" by 74 and "poor" by 4.

Comment on Trend of Prices

The general trend of prices for the month was downward; dry goods, shoes, furniture and automobile tires are characterized as firm.

The following table shows the percentage increase or decrease in net sales for March, 1921 as compared with February, 1921.

PERCENTAGE OF INCREASE OR DECREASE (—) IN NET SALES FOR MARCH, 1921, OVER FEBRUARY, 1921

	Hardware	Dry Goods	Groceries	Drugs	Shoes	Stationery	Furniture	Auto Tires
No. of reporting firms	23	11	30	12	15	20	19	14
Los Angeles	18.9	.....	11.0	14.8	31.7	—15.0	11.1	28.0
San Francisco	29.8	30.0	28.2	13.2	82.3	36.9	6.1	51.0
Seattle	33.1	.....	.....	.....	55.8	— 5.7	29.7	—32.6
Portland	44.5	32.1	27.1	8.5	76.7	—15.2	15.4	.....
Tacoma	—11.7	.....	16.5	.....	.....	.....	89.8	.....
Spokane	68.3	.....	13.4	.....	.....	9.7	23.3	34.4
Salt Lake City	51.5	47.8	23.1	.....	.....	43.5	.....	—17.3
Sacramento	40.1	.....	20.8	.....	.....	.....	.....	.....
District	33.9	28.5	20.9	14.3	68.4	1.3	19.7	46.7

SAN FRANCISCO

There are indications that both wholesale and retail trade in practically all lines has improved during the past two weeks. It is also evident that the spirit of depression is giving way to a more optimistic feeling due undoubtedly to the realization that to get business it is now necessary to work for it. This is a more normal and healthy condition and points to better times ahead.

The outstanding feature affecting the electrical industry is the continuation of building activities, and although this had a setback as the result of the strike in the building trades, permits continue to be issued in approximately the same volume as during the latter part of March. In Oakland and Berkeley there has been a noticeable increase in residence building. Electrical contractors report business as good.

In the retail trade there has been considerable activity as the result of the "market week" activities and the influx of visitors because of the opera. Delivery of goods from the East has been slow and as this has called forth considerable comment it indicates that retail stocks are getting low. Collections are good.

In the agricultural districts crop conditions are good in spite of the lack of late spring rains. The rice crop that was left over from last fall is being harvested and is in good condition. The damage of the March frost to the raisin crop is not as serious as first reported. There has been an increase in shipments through the port a larger quantity of material being received from the east coast, it being cheaper to ship by water than by rail.

There is less unemployment both in San Francisco and throughout the northern part of the state, but manufacturing continues to be on a part time basis. The oil refineries are increasing production.

LOS ANGELES

The most cheerful factor in this city is the sustained interest in building which means continued employment for a large body of workers and prospective relief to the housing problem. During March 1,185 dwellings were started to which should be added 10 apartment houses and 24 flats. The smaller communities about Los Angeles are building at a proportionate rate. All this is reflected in activity at the harbor which is breaking all previous records in tonnage. In an address before the Electric Club on April 18th, R. H. Ballard, vice-president and general manager of the Southern California Edison Company, said that Los Angeles is the one bright spot on the financial map of the United States. Motley H. Flint, vice-president of Los Angeles Trust and Savings Bank, says that lumber prices will probably advance in the near future and urges immediate work on any building plans. This possible advance will be offset,

however, by increased production of labor. Bank clearings continue at a high level, the total for the week ending April 14th being $80,000,000. A large number of security offerings have been put out recently and have been well absorbed. Some concern is manifest in the threatened printers' strike scheduled for May 1st. The local men do not want to go out but may be overruled by the national organization. Labor conditions generally are good and skilled men are well employed.

SALT LAKE CITY

The complete shutdown of the copper mining industry, resulting in a large increase in unemployment, has had its depressing effect on many other lines of industrial activity, and the whole intermountain section is feeling such effect, in some classes of business more directly than others.

The electrical dealers and jobbers are affected not only by the general decrease in retail sales, due to the tendency of the people to buy only those things which they absolutely must have, but also by the decreased demand for line material and electrical equipment and supplies by large users of electrical energy.

Mining conditions in those sections where silver is the principal product, are much better, although even the operations of these mines are handicapped considerably by the refusal of the smelters to take large quantities of ore, because of the fact that the smelters cannot handle such ores advantageously in the absence of the fluxing qualities of the copper and various other kinds of ores.

Business men, in general, are not pessimistic over the general situation. While they agree that present conditions are not good, they are inclined to look forward into the future with much hope, with the feeling that the present readjustment period will result in placing business in all lines on a substantial footing for future operations. They know that copper has not gone out of style, and that the red metal will ultimately be consumed in greater quantities than ever before when the present stressed conditions improve. Of course, how long present conditions will continue nobody knows, but it is hoped that the period will be short.

In Salt Lake City there were 112 permits for new construction, to cost approximately $250,000, issued during the month of March. During April and May these figures will be greatly exceeded. One firm alone plans the erection of one hundred homes, and another is to build several large apartment houses in the residential districts.

PORTLAND

Heavy gains in building, due largely to a readjustment of wages paid in the building trades, are expected to deliver a knockdown blow at unemployment in Portland and Oregon. Added to this are millions for labor in highway building, no less than $2,000,000 in contracts having been awarded within the past week alone. An analysis of building costs shows a decrease of 24 per cent below the peak prices paid for labor and material. A recent reduction of 10% in the wages of workmen in the building trades will, it is expected, boost building operations considerably. With a gain of 39% in building, Portland has been exceeded by only two western cities during the year ending in March, according to statistics recently announced.

The situation in the lumber industry remains practically unchanged, although a number of logging camps and saw mills are resuming operations. Lumber production in the Portland district is about 75% normal, while for the state in general it is only about 50% normal. Unemployment in Portland and the whole state is becoming less acute gradually. Spring activities on Oregon farms, extensive road work, and the reopening of a number of saw mills that have been shut down for the winter, are all militating against the unemployment situation.

SEATTLE

Business in this territory, including industrial, financial and constructional activities, is holding its own. During the past month there has been no noticeable increase, neither has a decrease in trade volume been apparent.

Lumber production in this section and for the entire Douglas Fir districts in both Oregon and Washington, continues far below normal; in fact, the last official statement of the West Coast Lumbermen's Association, issued the middle of April, which represents a majority of the larger mills in the two states, announced that production was still 39 per cent below normal.

Some of the larger mills which resumed operations early in March have been compelled to discontinue by reason of restricted markets, comparatively high operating charges and sales returns which are below cost. It becomes more and more apparent that any lumber buying of consequence for 1921 will be from east of the Mississippi river and north of Ohio. This, according to the West Coast Lumbermen's Association, forecasts intermittent west coast operations on a production level considerably below normal, until such time as freight rate adjustments restore the competitive relationships which existed in Eastern markets prior to August 26th, last.

Manufacturers in this district report that the volume of business remains about the same, with no noticeable fluctuation either way. Stocks of manufacturers are in good shape and are becoming more stabilized. Jobbers in the electrical field, as a whole, report very little change in business for the past few weeks, stating that the greatest activity is from demands for saw mill electrification. There is still a downward trend in prices on certain articles. Stocks are in excellent condition—the best for many years. The only shortage of consequence seems to be for pins and insulators for medium high tension work. Prospects for the coming summer seem promising.

With the advent of spring weather, residence construction, particularly, is showing considerable improvement and electrical contractors state business, generally speaking, has materially increased during the past three weeks.

SPOKANE

Business is showing signs of gradual improvement. While it is still comparatively quiet, it is by no means stagnant. Banks today show very satisfactory deposits compared with this time last year. Liquidation continues to be the chief business occupation and is proceeding safely and satisfactorily, though reduction of capital loans continues to be slow. Every indication is that many people have the money and the inclination to buy when convinced that the bottom has been reached and prices stabilized on a fair basis. There is a general demand that the prices of manufactured articles to the consumer reflect to a greater degree than at present the lower than pre-war levels of most of the basic commodities from which these articles are made, and a disposition to refrain from buying until this is a fact.

There is considerable other moderate-priced house construction and the sale by one company of low-priced lots to 65 different buyers in April indicates still further building activity. General crop prospects according to reports from all sections of the Inland Empire have not been better in many years. The lumber industry reports slightly increased mend, particularly for 2 by 4's used in house construction, from which is argued that the long deferred home-building movement in the East is under way.

The larger lead mining companies of the Coeur d'Alenes announced a wage reduction effective May 1 which probably insures the continued operation of their mines in the face of the continued low price of lead.

BUTTE

Conditions in Montana at present are extremely depressed, due largely to the almost complete shut-down of the larger mining and smelting interests, on account of unparalleled conditions in the metal markets.

This depression has been somewhat offset by the activities in oil. The development of this industry in Montana is still in an infant stage, but the state now claims 40 producing wells. It is reported that between ten and fifteen cars per day are being shipped from the Winnett field alone. Dr. J. P. Rowe, professor of geology at the University of Montana, has been quoted as reporting that the oil from Montana fields is of the highest grade.

The Montana Stock Growers' Association held their annual convention in Helena last week. During this session a number of important resolutions were adopted: asking for the enactment of tariff protection; urging graduated reduction in valuation of lands and freight rates; commending the Federal Reserve and local banks for their efforts in behalf of the live stock industry. The convention also went on record as favoring proper governmental supervision of the handling of meat, and all by-products, to correct if possible the great spread in the prices of cattle and meat, between the producer and consumer.

HAPPENINGS IN INDUSTRY

SUPER POWER SURVEY COMMITTEE OF NORTHWEST MEETS

A study of plans for guiding the economic power development, including the vast hydroelectric resources of the Northwest, is the work which has been undertaken by the "Superpower Survey Committee," which held its organization meeting in Portland April 20.

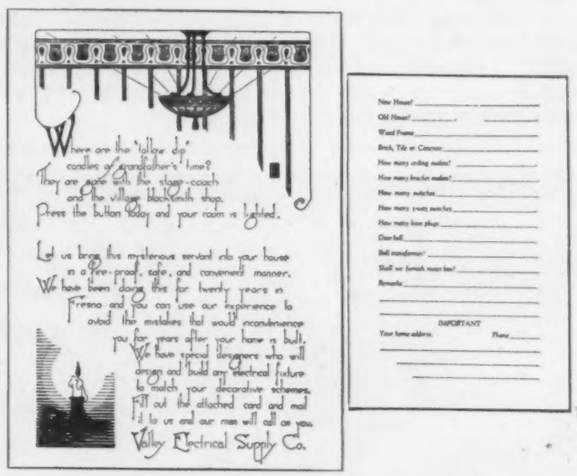
The work of the committee will not be confined to any one particular phase of the superpower project, but it plans, (a) to make a study and compile data to be available to the public, to capital, to existing and future operating companies, to industry in general and to commercial and legislative bodies; (b) to further industrial development by an attempt to forecast and indicate such methods of power expansion, development and interconnection as will ultimately prove sound.

The conference had its inception in the Oregon Technical Council, where the need for such a study was keenly realized, and a representative committee has been appointed to undertake the work. Various sub-committees have been appointed to carry out the many phases of the work, and these committees will report to the general committee which will meet from time to time.

The personnel of the general committee is as follows: D. C. Henny, chairman; J. C. Stevens, first vice-chairman, Spaulding Building, Spokane, Ore.; Professor C. E. Magnusson, second vice-chairman, University of Washington, Seattle, Wash.; F. H. Murphy, secretary, Electric Building, Portland, Ore.; R. M. Boykin, North Coast Power Co., Portland, Ore.; R. Beeuwkes, Chicago, Milwaukee & St. Paul Railway, Seattle, Wash.; W. H. Crawford, Portland Chamber of Commerce, Portland, Ore.; E. R. Cunningham, Oregon Electric Railway Co., Portland, Ore.; Professor R. H. Dearborn, Oregon Agricultural College, Corvallis, Ore.; J. B. Fisken, Washington Water Power Co., Spokane, Wash.; J. P. Growden, Skagit River Project, City of Seattle, Seattle, Wash.; F. F. Henshaw, United States Geological Survey, Portland, Ore.; R. M. Jennings, Douglas County Light & Water Co., Roseburg, Ore.; E. W. Lazell, consulting engineer, Portland, Ore.; L. T. Merwin, Northwestern Electric Co., Portland, Ore.; C. P. Osborne, Portland Railway Light & Power Co., Portland, Ore.; G. L. Parker, United States Geological Survey, Tacoma, Wash.; W. M. Shepard, California-Oregon Power Co., San Francisco, Cal.; G. E. Quinan, Puget Sound Power & Light Co., Seattle, Wash.; H. H. Schoolfield, Pacific Power & Light Co., Portland, Ore.; R. U. Steelquist, Mountain States Power Co., Albany, Ore.; W. R. Putnam, Idaho Power Co., Boise, Idaho, and R. B. Childs, Intermountain Power Co., Seattle, Wash.

ELECTRIC RANGES IN IDAHO APARTMENT HOUSE

The Wooley Apartments, at Pocatello, is one of the most modern and up-to-date in the state. One of the features of the apartments is the equipment of semi-automatic electric ranges, and in this connection the service rendered to the user of the range by the power company is spoken of in highest terms. A representative of the power company explains fully the details of the range operation to each new occupant of an apartment. One result has been the equipment of a large number of apartments in other Idaho cities and an increase in electric range sales.


Where are the "light up" candles of grandfather's time?
They are gone with the stage-coach and the village blacksmith shop.
Press the button today and your room is lighted.
Let us bring this mysterious servant into your house in a fire-proof, safe, and convenient manner.
We have been doing this for twenty years in Fresno and you can use our experience to avoid the mistakes that would inconvenience you for years after your home is built.
We have special designers who will design and build any electrical fixture to match your decorative schemes.
Fill out the attached card and mail it to us and our men will call on you.
Valley Electrical Supply Co.
New House?
Old House?
Wood Frame
Brick, Tile or Concrete
How many ceiling outlets?
How many bracket outlets?
How many switches
How many 3-way switches
How many base plugs
Door-bell
Bell transformer?
Shall we furnish meter box?
Remarks
IMPORTANT
Your home address
Phone

A TIE-IN WITH THE CONVENIENCE OUTLET CAMPAIGN

Modern homes should be completely wired for electricity and provided with convenience outlets essential for the efficient use of labor-saving appliances. To get this idea into Fresno homes an electrical supply company has sent out the attractive folder shown in the cut. The questionnaire is on a return post card, and a plan of a completely wired home is shown on the reverse, indicating the location of lighting fixtures and convenience outlets. This form of advertising is of material help in capitalizing the convenience outlet campaign.

PACIFIC GAS & ELECTRIC COMPANY TO BUILD RAILROAD ON PIT RIVER

Plans have been completed by the Pacific Gas & Electric Company for the construction of a broad gauge railroad 32½ miles in length which will be used to haul freight up to the Pit River project. The line will start at Bartel, which is the end of the present system of the McCloud River Railroad Company, and will run east through Cayton Valley to the site of Pit River Power House No. 1. The first 4.4 miles of this road will be built by the McCloud River Railroad Company and used by them as a spur.

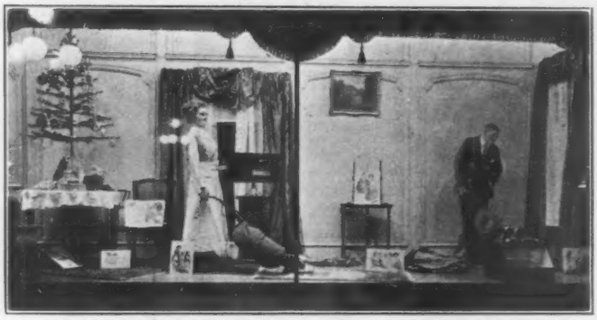
Ending as it does, just above Pecks Bridge, it will place it in a central position for the construction of all of the power houses on the Pit River project. The road will be built of 50-lb. rails and with a maximum grade of 4%. The location of the track has been carefully chosen with a result that the excavation will run less than one-half cu. yd. to the foot and the maximum curve will be 16 degrees.

The Pacific Gas & Electric Company started to build this road to compete with the cost of hauling by truck. It was found that the road could be built and the material hauled in to Pit River No. 1 almost as cheaply as could be done by hauling by trucks, and the bringing in of the material to the other power houses on the project will consequently be done a great deal more cheaply.

SAN DIEGO CONSOLIDATED GAS & ELECTRIC COMPANY SEEKS AUTHORITY TO REFINANCE

The California Railroad Commission has taken under advisement an application by the San Diego Consolidated Gas & Electric Company for authority to adopt a refinancing plan. The plan calls for an authorized bonded indebtedness of $50,000,000, the making of the necessary mortgage, the issuance of bonds to the extent of $2,750,000 and a stock issue of $328,600. The plan includes the properties of the San Diego Gas and Electric Company, a new corporation which recently acquired the power plant formerly owned by the San Diego Electric Railway Company. The bonds it is proposed to issue are first and refunding mortgage 6% gold bonds and the stock is preferred.

Evidence offered at the hearing was to the effect that a new financial set-up is necessary to enable the company to meet the growing demands upon it. The company estimates that in 1921 it will have to meet construction expenditures amounting to $1,700,000.



PRIZE WINDOW OF PORTLAND STORE

The window display which was awarded the first prize in the national contest conducted by the Pneuvac Company, displayed by Olds, Wortman & King, of Portland, Oregon. One of the original features of the window which led to the award was the figure of the woman in the center; the figure operated the sweeper and changed a series of six signs in the cabinet on which was written the chief talking points of the cleaner.

COLORADO RIVER COMMISSION PREPARES FOR ACTION

The recently formed Colorado River Commission is now gathering data and making preparations to get this in such a shape that it can be used as a basis for recommending steps to be taken to best develop the power and irrigation resources of the Colorado river.

This commission consists of the state engineers and state officers, having jurisdiction over irrigation and water rights, together with officers of the Reclamation Service. The commission was formed through the efforts of the League of the Southwest, in which are joined, as official members, the governors of the states of California, Nevada, Arizona, New Mexico, Utah, Colorado and Wyoming. In addition to the engineering commission, there is being formed a treaty commission, consisting of a high commissioner from each state, which will work with the engineering commission and formulate laws and prosecute treaties between the several states whereby the division of water in the interstate streams, and its diversion and power development, will be settled finally. It is expected that these treaties, since they will require approval by the Congress, will have a material effect upon present laws governing power development.

To the first of the year filings for power developments on the Colorado river and its tributaries exceeded 4,000,000 horsepower. Principal among these was the filing by the Southern California Edison Company on three sites, totaling 3,570,000 hp. This application has been held in abeyance pending thorough investigation.

Under the Kincaid Act, which authorized the Reclamation Service to investigate the problems of Imperial Valley, a report has been rendered covering the studies completed to date of Nov. 6, 1920. Since that date the investigations have been continued. These investigations include the work of diamond drilling at the Boulder Canyon dam site on the Colorado river between California and Arizona. It is reported that bed-rock has been found at a depth less than 140 ft. below the stream in the center of the channel. This depth is within practical limits, and at that site it is proposed to construct a storage and flood-control reservoir of a capacity of 25,000,000 acre-ft. Power would be developed at this location.

According to Director Davis, of the Department of the Interior, this power would be available for the following purposes, and in this order: To pump water to irrigate the lands above the gravity-flow lines; for municipal uses in the cities and towns served by the water from the project; for the use of other municipalities, such as Los Angeles and San Diego; and, lastly, for sale for the electrification of railroads, and other private and commercial industries, to the profit of the project. The irrigation districts affected, and the city of Los Angeles, have replied to this proposal of the Director, and have agreed to the provisions set forth. In particular, the officials of the city of Los Angeles have assured the Director that the city of Los Angeles would doubtless bond itself to make a major power development on the Colorado. A final report on the facts ascertained under the Kincaid Act will be rendered within a few months.

The data gathered under this Act, and the data available to the various state engineers, is now being put into shape and will later be given F. E. Weymouth, chief engineer of the Reclamation Service, Denver, who is secretary of the Colorado River Commission. A. J. McCune, Colorado State Engineer, is chairman.

WANTED: A NAME

The advent of the removable lighting units calls for a name which more appropriately describes them than the term "fixture," by which the ceiling and wall lights are known. A fixture as defined by Webster is something fastened in place or, in law, an article affixed to the freehold and consequently confined to one place. No qualification of this word "fixture" can make it serve as an appropriate term to apply to the new lighting units, for its use would signify permanency. The Society for Electrical Development feels that the new name should be discovered by someone, and invites the interest and cooperation of all in the search.

"Chandelier" will immediately suggest itself. This is a word derived from the noun "chandler," signifying a dealer in candles, oil, soap, paint and groceries, and was used to designate the first lighting unit of which there is any mention, the seven branch lumiere of antiquity. Early French historians classified chandeliers as chandeliers mobile (movable units), chandeliers suspendus (hanging units), and chandeliers fixes (fixtures). Reference is also made that the princes and gentlefolk had to have lumieres that they could transport from their chateaux to the city, or from the city to the country. The need introduced small metal lamps fashioned so they could be carried from place to place. Chandeliers suspendus developed into lumieres and lustres, candelabra and girandoles. The wall bracket of today evolved from "appliques." Lanterns, portatives or vivantes, became in time our modern lanterns.

These few references to lighting units of old have suggested "Lumieres Mobiles" and "Mobiliers" as appropriate names for the new units. Other suggestions have been "Portaliers" and "Removaliers." It is questionable whether any of these will find general favor, and it is hoped that more suggestions will be forthcoming.

THE PEOPLE'S TRIBUNAL

The following has been published by the National Electric Light Association with a sub-title, "A Resolution and Statement of Cause and Effect":

RESOLUTION ADOPTED

The following resolution was unanimously adopted at the annual convention of the Oregon State Chamber of Commerce in Portland, Oregon, December 29, 1920:

"**Resolved** by the Oregon State Chamber of Commerce, that it should be the policy of the state in the regulation of public utilities that the department of corporations and the Public Service Commission use their utmost endeavors in formulating constructive policies to establish highest mutual confidence and good will between the public and the public utility corporations to the end that the people of our state be willing to invest in securities of such utilities on equal terms with other progressive western states. We recognize as business men the mutual obligation to protect consumer and investor alike so that the former may pay no more than a reasonable rate for service and the latter earn no less than a reasonable return upon the investment, to the end that service may be efficient and adequate and that the capital of our state and other states may be attracted to the public utility industry in order to extend and develop facilities of service to meet the requirements and demands of the industrial development of the state."

January 8, 1921.

Mr. George Quayle, General Secretary,
Oregon State Chamber of Commerce,
Oregon Building, Portland, Oregon.

My dear Mr. Quayle:

In reply to the opportune resolution of the Oregon State Chamber of Commerce, in which it is urged that the Public Service Commission of Oregon use its utmost efforts in formulating constructive policies to establish the highest confidence between the public and the public utility corporations, to the end that the people of Oregon would be willing to invest in the securities of such utilities on equal terms with other progressive western states, we wish to state that as our public utilities have been passing through a most strenuous existence, the tremendous increase in the cost of material, supplies and labor, the unprecedented financial conditions have given the Public Service Commission some very difficult tasks to perform. We have felt an obligation to be fair to the utilities, and have realized that if the service were to be efficiently rendered a fair and liberal treatment must be accorded to the utilities by the state.

On the other hand, we have been compelled to consider the natural antipathy of the public to increased costs.

We have invested in public utilities in Oregon, upwards of three hundred millions of dollars, and there is need of many millions of new capital investment in order to adequately serve the public and keep abreast of the rapid development of our state, which has been greatly retarded due to the war.

This additional capital must be obtained by sale of new securities and not from revenue derived from rates paid by the public, as is commonly supposed. In order to be able to borrow new capital at reasonable rates of interest, manifestly, the utility must be sound financially, that is, receiving a fair rate of return on the honest investment in the present plant.

The Public Service Commission is the people's tribunal, created by law, and presumed to be informed by experience. The Commissioners are your servants, and you through your legislature have established our bounds over which we cannot pass. We are under solemn oath to support the constitution and the laws of Oregon, and to faithfully perform our duties according to the law. We are but human and probably will make mistakes, but our law has provided a remedy. If mistakes occur, an appeal to the courts is provided for. Furthermore, if a mistake is made, it is far more apt to be made in favor of the public than in the interest of the utilities.

We commissioners, like the judges of our courts of general jurisdiction, must be absolutely independent and must judge the cases before us and make our findings and order strictly upon the sworn testimony and the law. Far better no commission at all than one that constantly ignores the record and arbitrarily decides its cases according to whim or caprice, or political fortunes.

A commissioner who would be turned from the straight and narrow path of his duty and oath of office by popular clamor would not only violate his oath of office, but would be unworthy of the respect of any honest man.

The utilities are so tied into the business of the states and so interwoven with the growth, prosperity and advancement of every community that the greatest development and advancement is found in those states where commissions have acquired reputations for "square shooting."

The public must bear in mind that healthy and growing communities must have healthy and growing utilities; that sound and constantly expanding public utilities are essential to the welfare and prosperity of the communities served; that ever since 1916 conditions have resulted that have increased the cost of production and prevented the growth of utility service to meet the increasing requirements of the public and industry. These utilities are so tied into the business of the state that their rehabilitation, maintenance and growth must not be allowed to interfere with adequate service. A too low rate is just as unfair to the public as too high rates, for the reason that with too low a rate the public must suffer inadequate service, and the utility is compelled to pay a higher rate for its new capital acquired from the money markets, which burden, in turn, must be borne by the patron, and ultimately means further increased rates.

It should be borne in mind that the commission will not cause present patrons to pay rates that will make up deficits of the past, nor to extend the present plant to acquire new business. All new business must, under the law, be acquired by new additions to capital, and not from revenue derived from its present patrons.

The writer's experience with utility regulation teaches him that some broad-gauged plan must be devised in order to encourage the construction of new utilities in many communities not now served and to add and encourage the present utilities to reach the maximum of efficiency in operation, which also tends to a lower average price to the public.

Yours very truly,

(Signed) H. H. COREY, Commissioner,
Public Service Commission of Oregon.

HUGE SEARCHLIGHT FOR MOUNTAIN TOP NEAR SAN FRANCISCO

A searchlight of 500,000,000 candle power has been shipped to California where it is to be mounted on top of Mt. Tamalpais, a 2600-ft. peak about nine miles north of the Golden Gate, which commands an unobstructed view of the central valley of California, the San Francisco Bay district, and the shore-line of the Pacific Ocean for many miles north and south of the harbor entrance. The light was built for the United States government under a contract which was canceled after the signing of the armistice.

The cost of the searchlight will be from $10,000 to $12,000 installed, according to the method of mounting and the housing provided. The funds are being subscribed by various organizations interested in having the unique light on Mt. Tamalpais. The Mt. Tamalpais and Muir Woods Railway will maintain the light and provide an attendant for it.

The searchlight, which was built by the General Electric Company, has a 60-inch lens and will use 150-ampere direct current supplied by a generator built specially for this purpose and driven by a 30-hp., 2300-volt, single-phase motor, also of special design. The special motor was made necessary by the fact that the power line to the top of the mountain is 2300 volts, single-phase.

The beam from this searchlight will be 6,250 times more powerful than the beam from the lighthouse on Alcatraz Island, the most powerful light in the vicinity of San Francisco, and, according to W. D'A. Ryan, at least ten times more powerful than the largest searchlight used at San Francisco exposition in 1915. The light is intended primarily for signaling and for spectacular illumination on cloud and vapor formations that occur around the summit of Tamalpais.

GOOD-WILL PAMPHLETS OF THE SECOND "KILO-WATT" SERIES

A second series of "Kilo-Watt" pamphlets has been issued by the Public Relations Section of the N. E. L. A. The new series is titled "The Genie of the Button" and consists of six attractive pamphlets carrying a good-will message on financing, regulation, taxation and self-interest, built upon the foundation of the first series. The series is designed for distribution with customers' bills or with appliances sold across the counter.

PROPOSED ELECTRIFICATION OF THE PACIFIC GREAT EASTERN RAILWAY TO WHYTECLIFF

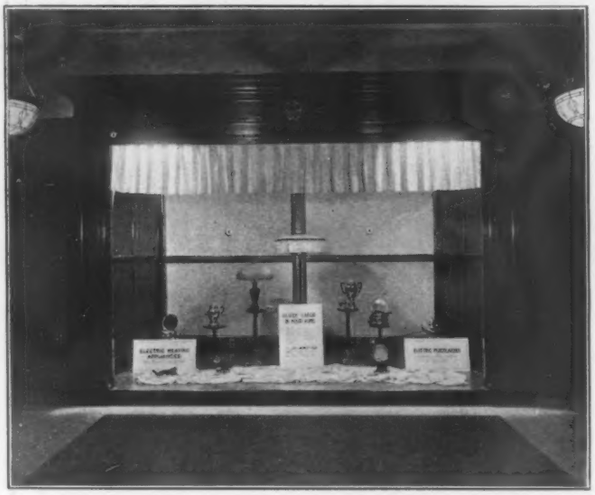
Electrification of the section of the Pacific Great Eastern Railway, running between North Vancouver and Whytecliff, British Columbia, a distance of 14 miles, is proposed by the government of British Columbia which owns and operates the line. The line, which has been operated by means of gasoline-electric cars, serves a suburban and summer colony population. The electrification would cost $275,000, it is estimated. Current would be purchased from the British Columbia Electric Railway Company and supplied through two substations, which would probably be automatic.

At present the proposal is delayed owing to the inability of the government and the municipality of West Vancouver to come to terms. West Vancouver is served by a system of gasoline ferries, municipally owned, running direct to Vancouver. Fares have been raised repeatedly on these ferries. The city of North Vancouver operates ferries to Vancouver and it is incurring a deficit. The P. G. E. line also is running behind in spite of increases in fares. West Vancouver has requested more frequent service in return for taking off its ferry service, thus diverting traffic to the P. G. E. and North Vancouver ferries. With the present equipment it is impossible to increase the service on the P. G. E. and electrification is the only solution of that difficulty.

PROMINENT MEN OF ELECTRICAL INDUSTRY VISIT PACIFIC COAST

The Merchandising Conference, held under the auspices of the Pacific States Electric Company in the cities of Spokane, Seattle, Portland, San Francisco, Oakland and Los Angeles, has brought to the Pacific Coast a number of prominent figures in the electrical industry of the nation. Among them we may mention the following:

A. D. Page, sales manager, Edison Lamp Works of the General Electric Company; Harry B. Kirkland, Sprague Electric Works of the General Electric Company; J. M. Shute, Lighting Service Department, Edison Lamp Works of General Electric Company; J. M. Smith, general sales manager, Ivanhoe-Regent Works of General Electric Company; Tom Casey, vice-president and general sales manager, Hurley Machine Company; Kolin Hager, Commercial Service Section of General Electric Company; R. E. Harrington, assistant to publicity manager, Edison Lamp Works of General Electric Company; A. C. Nodine, advertising manager, Electric Vacuum Cleaner Company; H. H. Russell, Southern District Manager, Edison Electric Appliance Company; H. Q. Beven, The Trumbull Electric Manufacturing Company; W. D. Yates, wiring device specialist, Supply Department, General Electric Company; T. J. McManis, manager, Department of Publicity, Edison Lamp Works, General Electric Company; Guy P. Norton, assistant general manager, Duplex Lighting Works of General Electric Company; A. L. Powell, Lighting Service Department, Edison Lamp Works of General Electric Company.



Factors affecting the attractiveness and selling appeal of windows were effectively illustrated by models, at the General Electric Merchandising Conference.

WASHINGTON STATE WOOL-CLIP TO BE POOLED

A plan to pool the entire wool-clip of the state of Washington, sponsored by the Washington State Wool Growers' Association, is the latest development in the acute situation of the growers, who are facing the lowest market in years. It is estimated that this year's clip in Yakima alone will be 2,500,000 pounds, or an increase of one-half million pounds over last year. But a very little amount of the 1920 wool crop is held in Yakima warehouses, most of it being in Eastern warehouses on consignment, and has not been sold. The price has dropped from 45 to 6 cents per pound. The Wool Growers' Association is considering the proposition of moving the wool from Puget Sound ports to the Atlantic seaboard by water, thereby saving $1.10 a hundred pounds on transportation charges.

THE SAN FRANCISCO PROGRAM

An intensive study of the factors affecting the industrial and commercial development of San Francisco has been made by Dr. B. M. Rastall, research engineer of the San Francisco Chamber of Commerce. According to Dr. Rastall six features are involved: (1) good city structure and facilities; (2) the best of living conditions; (3) energetic business development; (4) securing new population and industries; (5) good government; and (6) providing for the greater San Francisco. Taking up these features in detail, certain recommendations were made.

The peninsular location and hill areas of the city present certain difficulties in planning for future development, and the lack of transportation facilities and properly located streets must be remedied by the construction of new through streets and street car systems. The removal of Rincon Hill is considered essential. With these changes the city would be provided with accessible wholesale districts, manufacturing districts and residential districts, all having adequate transportation both by rail and water. Living conditions must be improved in order that all citizens may have advantage of the best physical and social environment, and the natural advantages of the city in this respect must be capitalized. A high average of business success being essential to rapid city progress, much must be done to develop the local market for products locally produced.

Any city must achieve a healthy growth; it is therefore necessary to bring to the city new industries which will support a greater population. To increase industrial activities and manufacturing, surveys must be made and scientific help and advice given. The relationship of good government to city progress is beginning to be appreciated, and expert service should be available, at least in an advisory capacity, to the city government. To provide for the greater city that will result, cooperation with the surrounding territory is essential, and team work on the part of all citizens is essential. Civic and business organizations of the city must be correlated, extended and given adequate strength.

PORTLAND PLANS INDUSTRIAL LIGHTING EXHIBIT

The electrical interests of Portland, under the direction of the Northwest Electrical Service League, are planning the installation of an industrial lighting exhibit. The room has been selected and the plans for the installation are complete. The exhibit will be patterned after the Pasadena exhibit and a number of others which have been installed throughout the country under the auspices of the Industrial Lighting Committee of the National Electric Light Association.

PACIFIC GAS & ELECTRIC COMPANY ENTERS INTO IMPORTANT CONTRACT

An important contract has been drawn between the Pacific Gas & Electric Company and the Red River Lumber Company, which has large timber holdings in the Pit river country where the Pacific Gas & Electric Company is engaged in a large construction program. By virtue of its holdings the Red River Lumber Company held large riparian rights on Pit river, Fall river and Hat creek and had intended to develop power on these streams for the purpose of making paper pulp. In exchange for all of their water rights and clear title to a strip of land twenty-five feet wide on each bank of these streams above high water mark, the use of roads, trails and camp sites and rights-of-way for pole and tower lines, and the right of rental of certain of the Red River Lumber Company's stock and equipment, the Pacific Gas & Electric Company has given them an option on Hat Creek Power House No. 1 and Hat Creek Power House No. 2. When and if they take over Power House No. 1 the Red River Lumber Company will pay for the actual cost of the plant minus a certain consideration. When and if they take over the second power house they will pay the Pacific Gas & Electric Company the actual cost of the plant. Until the time that these plants are taken over by the Red River Lumber Company they will be operated by the Pacific Gas & Electric Company.

The contract has been submitted to the California Railroad Commission for approval and is now being considered by that body.

OAKLAND STORE OF THE CALIFORNIA ELECTRICAL CONSTRUCTION COMPANY

Pleasing interior of the new Oakland store of the California Electrical Construction Company. The California Electrical Construction Company is the exclusive distributor of motors and industrial apparatus for the Westinghouse Electric & Manufacturing Company, and in addition to the Oakland store has one in San Francisco. Oren H. Chamblin will have charge of the Oakland store. Clyde Chamblin, president of the California Electrical Construction Company, is president of the San Francisco Electrical Development League and of the California Association of Electrical Contractors and Dealers.

QUARTERLY REPORT OF THE CALIFORNIA ELECTRICAL COOPERATIVE CAMPAIGN

Probably the most important work of the Campaign during the first three months of this year has been in the carrying on of the story of the electrical home. The adobe home at Windsor Square in Los Angeles was visited by 57,106 people, and moving pictures of this home were shown to about 50,000 people in Los Angeles and to about 45,000 people in San Francisco. The homes have been given unusual publicity through the newspapers. A portable commercial and industrial lighting exhibit has been shown in several cities and very satisfactory results obtained. The Campaign has moved into new quarters in the Humboldt Bank Building, San Francisco, where larger space provides additional facilities.

PORTLAND GAS RATES INCREASE

The Public Service Commission of Oregon has handed down a decision granting the Portland Gas & Coke Company authority to increase its gas rates from 30 to 70%, as a result of application by the company for an increase in rates predicated upon an increase in the cost of oil from 74½ cents a barrel to $2.70 a barrel in the open market. Improvements estimated to cost $1,141,230 are planned for this year.

Trade Notes

Electric Equipment Co. of Portland Re-incorporates —

The Electric Equipment Company, of which K. G. Harlan, formerly Portland city salesman for the Western Electric Company, was general manager, recently re-incorporated and elected new officers, Mr. Harlan having resigned and left the company.

Wells Motor Starting Switch Is Changed in Important Details —

In order to meet all the requirements of the electrical contractor for a motor starting switch, the Wells Morris Manufacturing Co. has sent questionnaires asking for suggestions and criticisms for bettering the Wells Switch. These have been incorporated in a new model. Some of the changes made are: stop mechanism removed from the cover and made part of the switch casting; the "stop" button protrudes through the cover and is of easy access; more room for wiring has been provided and methods of construction have been used that prevent the switch from humming when on the line.

Reiman Wholesale Electric Company Incorporated —

In order to more adequately serve the rapidly increasing California trade, Otto Reiman, formerly a co-partnership, has been incorporated under the name of the Reiman Wholesale Electric Company and will conduct an electrical jobbing business at 224-228 East Third Street, Los Angeles.

Production of Ajax Plural Socket Plugs Increased —

The Ajax Electric Specialty Company has recently brought out a new plural socket which has some improvements upon the former design. In order to meet the demands of the trade new individual containers have been substituted for the former carton containing twenty.

Globe Electric Co. of Seattle Has New Location —

The Globe Electric Company, Inc., which for years has been located at 906 Western Avenue, Seattle, will immediately move its place of business to 313 Occidental Avenue. This firm deals in wholesale electrical supplies, apparatus and equipment.

MEETINGS OF INTEREST TO WESTERN MEN

(Throughout the West during the past two weeks there have been held important meetings of men in industry which indicate a further advance of the cooperative idea. An exchange of engineering club privileges is suggested.—The Editor.)

Butte, Montana, Has Electrical Week

From Tuesday, April 12, until Saturday, April 16, Butte was the center of all branches of electrical industry in the state of Montana. The second annual convention of the Montana State Association of Electrical Dealers and Contractors was in session on April 14, 15 and 16. This young association, which has a total membership of thirty-five with five associate members, composed of manufacturers and jobbers, had in attendance thirty-two of the regular members, in addition to the honorary or associate members. During the convention matters vital to all members were discussed and a number of constructive moves looking toward securing the cooperation of contractors and architects, as well as central stations, were instituted.

On Thursday, April 14, the convention members were guests of the General Electric Company at their Merchandising Show at the Chamber of Commerce Building. The show was largely attended and enthusiastically received. The evening program of the Merchandising Conference was opened to the public, and many of the contractor-dealers and public utility representatives availed themselves of the opportunity of again attending.

On Friday Mr. Samuel Adam Chase, special representative of the Westinghouse Electric & Manufacturing Company, of New York, addressed the delegates to the convention at the Finlen Hotel. The subjects covered by Mr. Chase were "Harmonizing the Industry," "Better Wiring" and "Better Merchandising." After the address the contractor-dealers visited the Westinghouse Electric & Manufacturing Company's Merchandising Show, as well as exhibits which had been prepared in the different hotels by practically all manufacturing branches of the industry.

The contractor-dealers adopted a resolution that power companies, either private or municipal, be eligible to active membership, and this resolution has been or will be presented to all of the central stations in the state. The Montana Association of Electrical Contractors and Dealers was heartily endorsed, and it was recommended that every member of the Montana State Association immediately make application for active membership in the National Association, a committee being appointed to solicit the delegates present for this purpose.

Twenty-five branch managers, operating heads and commercial men of the Montana Power Company convened in Butte on Wednesday, April 13, for the purpose of discussing operating problems, merchandising of electrical appliances, betterment of service and other matters of particular interest to the central station. The Montana Power Company representatives were guests at the General Electric Merchandising Show and at the address of Mr. Chase of the Westinghouse Company. Many individual problems were given consideration and constructive ideas were exchanged during the power company's session, which lasted for two and one-half days.

On Saturday afternoon delegates to the convention visited the copper mines of Butte. More than three hundred were present at the banquet held in the Silver Bow Club on Saturday night, at which James H. Mills, of Great Falls, newly elected president of the association, acted as toastmaster. The next annual convention will be held in Butte.

Those in attendance reported the convention the most helpful event for the promotion of cooperation and good feeling among the contractors and dealers in Montana. A very attractive program was distributed at the convention.

Annual and Pacific Coast Convention, A. I. E. E.

In response to the demand of the membership of the American Institute of Electrical Engineers residing in the West that it be given the opportunity to act as host at an annual convention of the Institute, the thirty-seventh annual convention will be held in Salt Lake City, Utah, June 21-24, 1921. From the preliminary arrangements outlined by the Utah Section the program this year should be particularly interesting and profitable from many points of view. The Institute headquarters will be at the Utah Hotel and all technical sessions will be held there. The chairman of the convention committee, H. T. Plumb, has announced the appointment of 24 sub-committees which will handle the details. Some of the features of the tentative program are as follows:

The convention will open Tuesday morning, June 21, with the presidential address by Arthur W. Berresford. Following the presentation of technical papers under the auspices of the Electrical Machinery Division, there will be a "get-together" luncheon. The afternoon will be devoted to a visit to the points of historical interest near the hotel. An informal reception will be held in the evening. The Wednesday morning session will be devoted to technical papers presented by members of the Industrial and Domestic Power Committee. Special ladies' entertainment has also been arranged for Wednesday morning. In the afternoon a train trip will be arranged which will give an opportunity to inspect the mines and smelters west of Salt Lake City and to see the Salt Lake Valley and the Great Salt Lake. The Thursday morning session will be in charge of the Transmission and Distribution Committee; the afternoon will be assigned to "A Look at Salt Lake City." Friday morning has been assigned for the presentation of miscellaneous technical papers, and in the afternoon a trip is planned to the Utah Light & Power Company's terminal station. Arrangements have been made for out-of-door sports and interesting programs have been arranged for the evenings. Assistance will be given in arranging trips to points of interest, of which there are many, after the close of the convention.

San Francisco Section A. I. E. E. Holds Meeting at Substation

In order to fully illustrate the subject "A Variable Voltage Railway Converter Substation," presented by J. E. Woodbridge, the monthly meeting of the San Francisco Section of the A. I. E. E. was held in the Down-Town Substation of the United Railroads of San Francisco. The meeting proved very instructive and the inspection of the equipment was a particularly interesting feature.

Washington State Retailers' Association Elects Officers

The following officers have been elected to serve during the ensuing year for the Washington State Retailers' Association, which recently closed its annual convention in Tacoma, Washington: George A. Phillips, Spokane, president; C. W. Rhodes, Tacoma, first vice-president; George Wolff, Aberdeen, second vice-president; W. E. Draper, Yakima, secretary; G. C. Pratt, Seattle, treasurer.

Electrical Retail Dealers' Association of San Francisco Holds Interesting Meeting

An important and profitable meeting of the Association was held at the Stewart Hotel April 12. In addition to the reports of committees, manufacturers' representatives and jobbers dealing in vacuum sweepers were asked to explain their policy towards retailers with particular reference to national advertising, local advertising, and their policy of service to the customer and dealer, explaining whether this was through the dealer or direct with the customer. C. W. Banta, vice-president of the Wells Fargo Nevada National Bank, gave a very interesting talk on "The Relation of the Electrical Retail Dealer to His Banker."

Northwest Association Committees Meet

The governing committees of the Commercial Section and the Technical Sections of the Northwest Light and Power Association held a joint meeting in Portland on April 22, for the purpose of formulating a set of standard rules and regulations to govern line extensions to be adopted by all electrical utilities in the Northwest. It is not expected that the committee will make a report of its findings before the convention of the Northwest Electric Light and Power Association, to be held in Portland in June.

Ryan Talks to Los Angeles Chapter, A. I. E. E.

At the regular monthly meeting of the Los Angeles Chapter, A. I. E. E., Prof. Harris J. Ryan of Stanford University spoke on "The Atmosphere in Relation to the Insulation of Extra High Voltage Transmission Lines." Prof. Ryan used lantern slides to illustrate his theme and gave a review of the many unusual phenomena that have come under his observation during the course of his research work in the Stanford laboratories. Of particular interest were his charts showing the critical points in the relation between voltage and current.

Prof. Ryan was followed by Messrs. Wood and Michener of the Edison organization, who gave a report of their studies in 220,000-volt insulation.

East Bay Electrical Development League

One of the newer cooperative organizations of electrical contractors and dealers is the East Bay Electrical Development League which had its initial meeting the latter part of March this year, at which fifty-seven were present. The membership now numbers 114, an indication of healthy growth and the appeal of the spirit of cooperation which is absolutely essential at this time in the East Bay cities. Four very successful meetings have been held and it is certain that the League will become an important factor in bringing about a more satisfactory condition in the electrical trades. At the initial meeting George Furniss was elected president and Clark Baker secretary-treasurer of the league.

April Meeting, Seattle Section, A. I. E. E.

The April meeting of the American Institute of Electrical Engineers, Seattle Section, which was held in the Chamber of Commerce assembly room, Arctic Club Building, on April 19, was addressed by D. J. Lundy, district wire chief of the Pacific Telephone & Telegraph Company, on "Introduction of the Automatic Telephone in Seattle." The talk was descriptive of the automatic system and told of the program for its installation in Seattle.

Synchronous Club

"The Los Angeles Terminal Problem" was the subject of an excellent address delivered by Ralph Bennett before the Synchronous Club, Los Angeles, at their regular monthly meeting held in Edison Hall on the evening of April 12th. The terminal question is one of general interest in Los Angeles and Mr. Bennett's observations on this situation were highly interesting. Music was furnished by J. C. McKinley.

COMING EVENTS

PACIFIC COAST SECTION, NATIONAL ELECTRIC LIGHT ASSOCIATION
Annual Convention—Del Monte, California, June 7-10, 1921

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS
Annual Convention—Salt Lake City, Utah, June 21-24, 1921

NATIONAL ELECTRIC LIGHT ASSOCIATION
Annual Convention—Chicago, Ill., May 31-June 3, 1921

AMERICAN SOCIETY OF MECHANICAL ENGINEERS
Spring Meeting—Chicago, Illinois, May 23-26, 1921

CALIFORNIA STATE ASSOCIATION OF ELECTRICAL CONTRACTORS AND DEALERS
Annual Convention—Santa Cruz, June 16-18, 1921

SOUTHWESTERN ELECTRICAL & GAS ASSOCIATION
Annual Convention—Galveston, Texas, May 18-21, 1921

The next big event in the club will be the annual "synchronizing" to take place in May. This is a secret function presided over by the meanest dispositions in the organization.

Engineers' Club of Seattle Suggests Exchange of Club Privileges

The Engineers' Club of Seattle wishes to extend to the members of all engineers' clubs and associations a cordial welcome to participate in the privileges of the club while visitors or temporary residents of the city. It is hoped that the advancing of this offer will open the way for the exchange of club privileges by all clubs and associations throughout the United States, thereby making the clubs of more universal use to engineers at large. In order to further this idea the Seattle Club has sent out questionnaires to the various clubs and has requested suggestions. The Engineers' Club of Seattle is located in the Arctic Club Building. J. T. Dovey is president, L. T. Banks, secretary, and C. P. Dexter, chairman of the publicity committee.

Oregon Chapter, American Association of Engineers

The Oregon chapter of the American Association of Engineers at its recent meeting elected C. G. Thomas and W. C. Reugnitz delegates to the national convention to be held at Buffalo, in May. The chapter adopted a resolution favoring the topographic mapping of the state completely by the United States Geological Survey with the state's cooperation. Only a portion of Oregon has been mapped topographically while adjacent states have been completely mapped. The maps are serviceable for national defense purposes and moreover are of value in considering preliminaries toward irrigation developments, water power projects, highway location, mining and logging operations and other engineering problems.

Los Angeles Electric Club Passes 500 Mark

Within the first six weeks of its existence the Electric Club of Los Angeles has built up an active membership of 560 and is now aiming at a goal of 750. Interest in the club's work is manifest on every hand. The programs arranged by K. E. Van Kuran have all been of a high order and the ball room of the Alexandria is filled to overflowing for each Monday luncheon.

Recent speakers have been John Steven McGroarty, author of the Mission Play, who talked on early days in California; Jay W. Stevens, Chief of Pacific Coast Fire Prevention Bureau, whose subject was "The Economic Value of Fire Prevention," and Ralph J. Scott, fire chief in Los Angeles, who explained modern methods of fire control.

At the meeting of April 11th, Woodworth Clum, managing director of the Better America Federation, gave an inspiring address on present tendencies in government, with particular reference to the "Red" menace. Mr. Clum clearly indicated the necessity for our citizens to take more than a passing interest in civic affairs.

Jim Pomeroy, sergeant-at-arms, is a busy man at all the meetings, as he makes the rounds with the charity box and collects the fines which are assessed for real or imaginary infractions of the statutes.

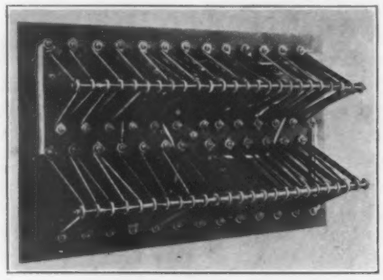
LATEST IN APPLIANCES AND EQUIPMENT

(In the application of electricity to industry, convenient appurtenances have become a necessity and standardization a feature of the newer types of apparatus. A replaceable unit rheostat, a swivel fixture hub, a standardized switchboard and an automatic bake oven illustrate these features.—The Editor.)

RIBBON TYPE OF RHEOSTAT WITH REPLACEABLE UNITS

High current capacity rheostats which must dissipate comparatively large amounts of power are usually made with cast iron resistor units, cast in such form as to give a large radiating capacity. Cast iron has many disadvantages when used as a resistor. For instance, it is heavy, breaks easily, changes its resistance considerably with temperature, and disintegrates when subjected to repeated overheating. High resistivity alloys in ribbon form compared with cast iron have the advantage of light weight and are not easily broken. However, there is some difficulty in supporting ribbon resistors so that they will not sag and short-circuit or burn off at points of contact.

The Ward Leonard Electric Company has recently developed a ribbon resistor unit, which is so designed as to utilize the strength of the material so that the complete unit is self-supporting. The unit is made by forming metallic ribbon



Interior view of Ribohm rheostat showing method of assembling units. This rheostat is designed for use with moving picture machines.

into a trough or channel-shaped section which is flattened at both ends and in the middle. The unit is then bent about the middle to form a "V" as shown in the illustration, and both ends are turned up to form supporting feet which permit the attachment of the unit to a suitable panel board.

The further advantage of this type of resistor unit is the light weight. Expansion of the unit is readily taken care of by the method of construction.

COLOR FILTER FOR LIGHTING REFLECTOR

The Holophane Company, 340 Madison Ave., New York City, has developed a color filter for use with their Window Lighting Reflector No. 922. This color filter is made in all colors and is arranged to clip on the lower edge of the reflector so that it may be easily put on or taken off without the use of tools. Several installations of these reflectors and color filters have been installed for decorating windows for Christmas or special occasions where color effects were desirable, the colors used being red and green.

OUTLET BOX COVERS WITH SWIVEL FIXTURE HUBS

The Appleton Electric Company, of Chicago are manufacturing a line of outlet box covers equipped with swivel

Raised cover outlet box with a swivel equipped with a swivel fixture joint permitting the fixture to always hang plumb.

fixture joints or hubs, for either ⅜ or ½-inch conduit; and also a combination hickey and swivel fixture joint. Raised covers with the swivel hub can be furnished for three-inch and four-inch round or octagonal boxes, and square covers can be furnished for four-inch square boxes. The flexibility of these

Combination hickey and swivel fixture joint

fixture joints prevents breaking of the fixture at the point of suspension and the fixture will always hang plumb even though it may be jarred through accident. The combination hickey and swivel fixture joint is similar in design to the Unilet swivel fixture joint, but has as an added feature that of being a hickey, thereby eliminating the use of an ordinary hickey.

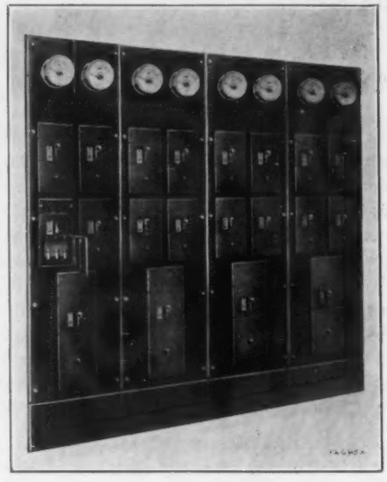
DEAD FRONT & REAR SWITCHBOARD

A radically new type of switchboard, manufactured by the Krantz Department of the Westinghouse Electric & Manufacturing Company, provides complete safety to the operator. There are no exposed contacts of any kind, either front or rear, nor is it possible for the operator to reach live parts under any circumstances without dismantling part of the board. These boards are suitable for any capacity up to 600 amperes, 250-volt direct current, and 1000 amperes, 600-volt alternating current. They may be equipped with any number of switches, circuit breakers, meters and other switchboard instruments, and are applicable for hotels, office buildings, theatres, industrial plants, and for marine work.

The board can be made up of any desired number of panels, each of which consists of a heavy sheet-steel front, which is finished to resemble slate and is mounted on angle iron supports with cross beams to make the construction rigid. Openings of the proper size are provided in the front and into these switches and other instruments are accurately fitted and supported by angle irons in the rear.

The switches are of the Krantz Autolock type with all of the safety features retained. Each switch is in a separate compartment and is operated by a handle which projects through the cover but is always dead. A door gives access to the fuses but it is interlocked with the switch and cannot be opened unless the switch is in the off position and all accessible parts are dead. The switch cannot be closed while the door is open.

In addition to the fuse door, each switch has a cover which is held in place by screws. The removal of this cover gives access to the bus-bar connections and switch mechanism for inspecting the switch contacts, for making load tests of motor circuits without interrupting the service, and for renewing or repairing the switch. All parts are removable from the front. The bus-bar connections are made through studs which connect with the stationary switch contacts. Because of this construction there is little need to go behind the board and the rear projection is small, so that it can be placed very close to the wall. Suitable pull boxes can be provided at the top or the bottom of the board if required.



Dead front and rear switchboard made by the Westinghouse Electric & Manufacturing Company, which presents some new features in switchboard design.

AUTOMATIC ELECTRIC BAKE OVEN

The Westinghouse Electric & Manufacturing Company has just issued a descriptive leaflet which describes and illustrates the automatic electric ovens for commercial baking of pies, bread, cakes and pastry. This leaflet is printed

in two colors and it gives in detail the construction and advantages of the use of electric ovens. The advantages of this automatic electric bake oven and methods of operation are given in full. The discussion is given of the use of the oven in public bakeries, hotels, meat and packing plants, restaurants, public institutions, such as state hospitals, large industrial plants and private plants.

NEW TYPE OF BOLTLESS FIXTURE STUD

The fixture stud which has recently been placed on the market by the S. R. Fralick & Company of Chicago has many advantages, particularly the fact that the stud is installed without the

"Kwikon-Nobolt" fixture stud which in addition to doing away with the use of bolts can be installed in a minimum of time.

use of bolts and can be used to support the outlet bow, and is particularly designed for use with conduit work. The method of installation is very simple; the stud is placed on the back of the outlet box with the threaded shank extending through the center knockout, the two small pins on either end of the base register with the bolt holes of the box and prevent turning. A locknut, furnished with each stud, is run on the shank and holds the stud and box firmly together. The stud will be marketed under the name "Kwikon" fixture stud.

Books and Bulletins

Electric Welding

By Ethan Viall. First edition. 417 pp., 6 x 9, 329 illustrations. Published by McGraw-Hill Book Co., Inc., New York. For sale by Journal of Electricity and Western Industry, San Francisco.

The appearance of a book on electric welding by the editor of American Machinist will fill a want for an authoritative text on this subject. Arc welding with its practical, every-day shop applications for repair and manufacture is becoming an increasingly important process in a great variety of plants, and is encroaching upon the field in which the gas torch has been considered supreme as the result of improvements and the development of mechanical devices for controlling the arc. After describing the historical development of arc welding the book takes up the various commercial types of arc welding equipment in detail and describes the different makes of arc welding sets. Chapters are devoted to the following subjects: training arc welders; carbon-electrode arc welding and cutting; arc welding procedure; physical properties of arc-fused steel; metallography of arc-fused steel; automatic arc welding; butt-welding machines and work; spot-welding machines and work; welding boiler tubes by the electric resistance process; electric welding of high-speed steel and Stellite in tool manufacture; electric steam welding; and, making proper rates for electric welding, and the strength of welds.

Throughout the West, where electricity is almost everywhere available, electric arc welding necessarily must play an important part in repair work and in manufacturing. This type of welding is particularly suited to out-of-the-way places, for when once installed further service is not needed.

Engineering of Power Plants

By Robert H. Fernald and George A. Orrok. Second edition. 595 pp., 6 x 9, 320 illustrations. Published by McGraw-Hill Book Co., Inc., New York. For sale by Journal of Electricity and Western Industry, San Francisco.

The book is designed for convenient class room use, and has been used at the Case School of Applied Science and the University of Pennsylvania. In the preparation of the book two ideas have been uppermost: (a) to bring to the student a realization of the fact that engineering, although based upon the exact sciences, is not itself an exact science but requires on the part of the successful engineer a natural fund of "common sense" and the application of engineering judgment—a realization of the fact that accuracy may mean within twenty per cent and not the seventh place to the right of the decimal point; and (b) to give the student some idea of the commercial side of engineering—a field too seldom touched upon in many engineering courses.

In the carrying out of these thoughts the authors have been successful, the text is therefore useful for others than students, and one who has the power problems to solve will find the method of treatment useful. More than half the book is devoted to steam generation of power and the fuels that may be used; the remainder of the book deals with internal combustion engines, producer gas and gas producers, compressed air, refrigerating machinery and hydraulic power. The volume has a complete index and many useful tables.

Report of the California Electrical Cooperative Campaign

Reflecting in a very attractive booklet the achievements of a highly successful year, the California Electrical Cooperative Campaign has issued its third annual report. The report reviews the accomplishments during 1920 and outlines the plans for 1921. Some of the outstanding features of the past year have been the special campaign on convenience outlets which was followed by the establishment of electrical homes in most of the larger California cities. Industrial and commercial lighting exhibits have accomplished much along these lines. In the work of promoting closer relations between the power companies and the electrical contractors and dealers, the activities of the Campaign have brought very satisfactory results. Many standard accounting systems have been installed and better merchandising methods have been introduced. During 1920 the membership of the association has increased approximately 54 per cent with about 80 per cent of the established contractors and dealers of the state as members.

Plans for 1921 include: an extensive development of the convenience outlet idea through personal work with architects and builders, and through the establishment of electrical homes; the furtherance of proper accounting methods; bringing to the attention of industry the vital importance of hydroelectric resources; and, industrial illumination. In addition to these activities the Advisory Committee will continue its work with all of the problems of the contractor-dealer, as well as with other questions affecting "better service to the public."

New Starter Booklet

Type F Automatic Starters for Squirrel-Cage Induction Motors is the title of Leaflet 1660-A, which is being circulated by the Westinghouse Electric & Manufacturing Company, East Pittsburgh.

Electric Heating & Manufacturing Co. Issues Heating Bulletin

Advantages of a standardized heating unit which can be used in combinations to meet requirements and conditions for large and small amounts of heat are pointed out in a bulletin issued by the Electric Heating & Manufacturing Co., of Seattle, manufacturers of Apfel's "Heet-Feet" unit heating element and other devices. Single units of this type consume 1000 watts at 110-120 volts either a.c. or d.c., and these can be connected up to take any wattage from 500 watts to 500 kilowatts, by making the connections in series, in multiple or in a combination of the two methods. These units are useful for many purposes, such as in driers for dehydrating fruit, as well as for heating out-of-the-way places and for use in the home. The company also manufactures electrically heated glue pots, electric radiators, electrically heated chocolate dipping tables, and "Copperset" electric water heaters.

New Sangamo Meter Bulletin

The importance of meter accuracy is well understood by central station operators, certain features of design and principles of construction of the Sangamo meters described in the new bulletin are therefore of interest. The rotating standard of the meter is described in detail as well as the line of current and potential transformers for use with the watt-hour meters. The line of meters and transformers has been extended by the addition of several new types which are described in the bulletin.

Allis-Chalmers Bulletin on Potential Starters for Induction Motors

The necessity of potential starters for squirrel cage induction motors, combined with the wide use of this type of motor, results in a wide demand for starters that are rugged and that meet the exacting requirements of service. The Type "R" potential starters made by the Allis-Chalmers Manufacturing Company are described in a recently issued bulletin.

NEW ELECTRICAL and INDUSTRIAL DEVELOPMENTS

(An addition to the Oregon Agricultural College; extension of highways and the building of new bridges and docks in King county, Washington; expansion of the machinery division at Mare Island and a large shipment of wool from Reno; the successful close of the California Raisin Growers' Campaign in San Joaquin Valley; extension of Pacific Electric Railway and a new city hall for Long Beach; construction of a big tunnel in Sanpete county, Utah, and a new water system for the city of Blackfoot, Idaho.—The Editor.)

THE PACIFIC NORTHWEST

REEDSPORT, ORE.—The Reedsport Light and Power Company plan the installation of a Diesel engine for driving their generators, owing to the difficulty of getting wood for the present plant.

BAKER, ORE.—The W. H. Eccles Lumber Company has resumed operations with a full shift of men. This plant had been shut down during the winter owing to the unsteady market conditions.

PORTLAND, ORE.—The Hardin Manufacturing Company of Portland, Oregon, A. Buck, president, plans the erection of a factory at Kalama, Wash., for the manufacture of auto accessories and toys.

HOQUIAM, WASH.—The entire plant of the Aloha Lumber Company, near Hoquiam, Wash., was recently destroyed by fire, entailing a loss of $300,000. Approximately 275 men are out of employment. Ralph D. Emerson of Hoquiam is president of the company.

WALLA WALLA, WASH.—Plans and specifications have been completed by Ernest B. Hussey, civil engineer of Seattle, for a proposed water supply system for the city to cost $500,000. It is expected that bids will be called for on the work in the near future.

PORTLAND, ORE.—That the Astoria Marine Iron Works plant is to resume operations at once is the statement of Thomas S. Bilyou, secretary of the company. The first work of the plant will be the construction of a rock crusher, screen and elevator for Clatsop county.

TACOMA, WASH.—A resolution initiating the improvement of the down-town streets running east and west, by the installation of ornamental lights, was recently introduced in the city council by Commissioner of Light and Water Ira S. Davisson. Streets from 8th to 17th Streets, inclusive, are affected.

JUNEAU, ALASKA.—During the biennium of 1919-21, approximately $765,000 was expended on co-operative road projects, and in territorial road building. Under the cooperative road act, passed by the 1919 Alaska legislature, all but $201,000 of this sum was provided by the Department of Agriculture and the Alaska Road Commission.

VANCOUVER, WASH. — The Northwestern Electric Company has been granted a 50-year franchise to operate in the city, furnishing power for light and domestic purposes. The company has filed application with the county commissioners for permission to operate pole lines over the roads of Clarke county. A hearing will be held on April 26th.

CORVALLIS, ORE.—Excavation for the proposed commerce building to be erected at Corvallis for the Oregon Agricultural College is under way and construction on the building is expected to be started as soon as the plans are completed by John V. Bennes, architect, Chamber of Commerce Building, Portland. It is planned to have the structure completed next January.

TACOMA, WASH—The city of Tacoma has started preliminary investigations of the rock gorge at the Lake Cushman power site, where the city proposes the location of the great impounding dam of the project. Bids will be called shortly on drilling a number of holes in the bottom of the gorge, to determine the nature of the rock structure, and to guard against any possibility of an imperfect foundation for the dam.

RIDGEFIELD, WASH.—The Ridgefield Light & Power Company recently filed articles of incorporation, naming a capitalization of $17,000. The company announces its intention of buying, selling, erecting and maintaining lines for electricity. Incorporators are as follows: N. C. Hall, J. M. Blackburn, W. E. Lentz and others. All can be reached through McMaster, Hall & Schaefer, Vancouver National Bank Building, Vancouver, Wash.

TACOMA, WASH.—Construction of the new city warehouse and store building for the city department of light and water has been undertaken by day's labor under the supervision of city officials. This action was determined upon when the low bid received in response to the city's call exceeded the $80,000 appropriation by $8,000. The structure will be erected on South 24th and Holgate Streets, and will be of fireproof construction, 20 x 100 feet in size, two stories high.

SEATTLE, WASH.—Plans completed recently by King County Engineer Thomas R. Beeman and the Board of County Commissioners at Seattle, contemplate the expenditure this summer and fall of $694,538 on county highways, bridges and docks. This program is the most ambitious one since the beginning of the war. Of the total sum, approximately $387,000 is from the Permanent Highway Fund, one-half of which is raised by the county and the other half contributed by the state.

STEWART, B. C.—The purchase of the 14-mile standard gauge railroad from Stewart, B. C., running up the Bear river, by the Canadian Pacific Railroad, forecasts extension of the road to tap the Ground Hog coal fields, in the interior of British Columbia. About 100 miles of road will have to be constructed to carry out the plan, which was in the original scheme of the Canadian Northern, which built the Bear River road, and later sold it to the C. P. R. Coal deposits in the Ground Hog district are said to be semi-anthracite, immensely rich, covering a large area.

SEATTLE, WASH.—Immediate delivery of the $1,000,000 worth of Skagit bonds bought by two local bond houses has been arranged, instead of delivery over ten months, a right which the bond houses reserved in making the offer recently. Printing of the bonds has been completed. The remaining $1,100,000 will go to the manufacturing companies which received the machinery award for the Skagit power station. The $2,100,000 issue, after paying for the machinery, will leave $1,000,000 cash to finance the Skagit work this summer, preparing the project for reception of machinery next year.

THE PACIFIC CENTRAL DISTRICT

REDDING, CAL.—The Pacific Gas & Electric Company will build a railroad from Bartle, the eastern terminal of the McCloud River Railroad, to the prospective power houses on the Pit river. The road will be about thirty-five miles in length and will cost approximately $750,000.

FRESNO, CAL.—The contract campaign of the California Associated Raisin Co., closed Saturday night, with 12,441 of the 13,375, or 93 per cent of the growers in the state signed up for the next ten years. The two weeks' extension of time brought in 610 new signatures.

SAN FRANCISCO, CAL.—A report of the operations of the San Francisco-Sacramento Railroad Company reveals net earnings of $254,-361, and an increase in operating revenue of $111,145 for the eleven months of operations under the new management.

DAVIS, CAL.—With the object of determining what varieties of sugar beets are best suited to Sacramento Valley conditions and of securing data on the best methods of culture and irrigation, sixteen varieties of sugar beets have been planted at the University Farm this season.

SAN FRANCISCO, CAL.—Mount Tamalpais and Muir Woods Railway contemplates the purchase of a new locomotive and has applied to the Railroad Commission for authority to execute notes for $15,000 to secure funds to insure delivery. The First National Bank of San Francisco has agreed to advance the money.

RICHMOND, CAL.—Completion of the big dam of the East Bay Water Company across San Pablo Canyon within the next three months was promised by Manager George H. Wilhelm of the water company. This is the schedule under which Bates & Borland, constructing contractors, are working. Extra crews of men have been put on the job to rush the work to completion.

FRESNO, CAL.—The California Peach and Fig Growers, Inc. made the first payment on the 1920 fig crop marketed through the Association on Wednesday, April 20. Payments were in the form of 90-day notes and amounted to around $100,000, representing 2½ cents per pound. Final settlement will be made when the entire crop is sold, and will be based on individual grades.

BRIDGEPORT, CAL.—The bringing of water to Bridgeport Valley through the reservoir project of the Walker River irrigation district is expected to have a large bearing upon the upbuilding of this section. The reservoir is to cover a large area and will touch the town limits of Bridgeport. The greatest benefit is expected to come from the development of farms and expansion of dairying.

VALLEJO, CAL.—Officials of the machinery division at Mare Island stated on April 14th that if the present plans for the manufacture of gas engines and gas engine parts results in the amount of work anticipated it will be necessary to expand Shop 24 to twice its present size. The shop has at present about 9000 square feet of floor space. The public works department is making plans for the proposed additions.

SAN JOSE, CAL.—It has been definitely announced that the Southern Pacific Railroad has decided to abandon its present tracks through the city and the depot at North First street. Evacuation of the present lines and the depot will take place as soon as possible after plans have been made for the new tracks and depot. No definite announcement has been made as to the location of the new station and right of way.

SACRAMENTO, CAL.—Representatives of the hydro-electric power companies will contest the passage in the Assembly of the M. B.

Johnson Senate bill which gives to cities and groups of rural communities right to form districts to conduct municipal power plants. The measure passed the senate unopposed as there were enough votes to pass the bill, the contest was therefore put off until the bill came up in the Assembly.

OAKLAND, CAL.—The Luthy Co., Inc., has been organized to manufacture Luthy batteries in this section of the country. This information was given out by J. P. Schiller, manager of the Luthy Battery Co. in San Francisco. According to Schiller the new concern has purchased a factory at Hayward adapted for the work and will soon be in a position to produce between 300 and 400 batteries a day. The grounds provide for additions as business grows.

DORRIS, CAL.—An irrigation system comprising 40,000 acres of fertile sandy loam soil in extreme northern California, the consummation of which will cost half a million dollars, is being organized by farmers of Butte valley. Water will be secured by damming Antelope and Butte creeks, as well as several other smaller ones southeast of Macdoel, a small town 12 miles south of here on the Weed-to-Klamath Falls line of the Southern Pacific railroad.

RENO, NEV.—Three carloads of wool were shipped to Boston from Reno, with three more cars to be forwarded shortly. This marks the first important shipment of Nevada wool since the sensational break in prices last summer. It is understood the buyer made advance payments of 7 to 10 cents per pound on the wool. Other buyers are commencing to appear and the situation is considered encouraging. Much of the wool will be shipped East by way of the Panama Canal. Local wool men state buyers are negotiating for the 1921 clip.

SAN FRANCISCO, CAL.—An issue of $2,570,000 Turlock irrigation district serial 6 per cent coupon bonds, due July 1, 1936 to 1951, is being offered by a group of San Francisco investment brokers. The purpose of the issue is to enable the Turlock irrigation district to meet its share of the expense of building the Don Pedro dam, financing of which is to be borne by the Turlock and Modesto irrigation districts. A description of the district is given in a booklet, "The Marvel of Irrigation," now ready for distribution by members of the syndicate headed by the Anglo and London Paris National Bank.

THE PACIFIC SOUTHWEST

LOS ANGELES, CAL.—Fire destroyed 200 feet of Pacific Electric trestle between the harbor district and the drawbridge at Los Angeles harbor.

LOS ANGELES, CAL.—It is reported that the Pacific Electric Railway will extend lines from Torrance to Redondo, to furnish transportation facilities for this rapidly expanding industrial district.

EL CENTRO, CAL.—Estimates of the acreage in canteloupes in the Imperial Valley for this year is 21,288, and it is expected that about 11,000 cars of melons will be shipped from the district.

REDONDO, CAL.—The board of trustees will call a bond election May 24th for the purpose of voting on a bond issue for improvement of the breakwater on the water front. The amount is not yet decided.

MESA, ARIZ.—J. W. Leseur, of Salt Lake City, president of the Mormon Church, states that plans have been completed for a temple to be erected in Mesa at a cost of $400,000. Work will commence about July first.

TULARE, CAL.—The Board of Trade is raising funds for the purchase of a site which will be used for a four-story modern hotel to be erected and furnished by a group of Los Angeles capitalists. The project will cost $250,000.

LOS ANGELES, CAL.—The University Club of this city will erect a new home on Hope Street, between Sixth and Seventh Streets, to cost $400,000. It will be a fireproof building of eight stories. Allison and Allison, Hibernian Building, are the architects.

LOS ANGELES, CAL.—Plans are being prepared by Architect J. Frauenfelder, Story Building, for a six-story Class A hospital building for the California Lutheran Hospital Association, to be erected at the corner of Hope and 15th Streets, at an estimated cost of $700,000.

SAN DIEGO, CAL.—Lange and Bergstrom, Timken Building, San Diego, have a contract amounting to $350,000 for a deep-water wharf to be constructed for the North Island naval air station. The wharf will be 50 feet wide and 500 feet long and will carry a standard gauge railroad track.

GLENDALE, CAL.—An option has been taken on 68 acres at the foot of Broadway by W. O. Bruess, who has completed arrangements for the construction of a big tire factory. The ultimate cost is stated to be in excess of $8,000,000. The project has been endorsed by the Glendale Chamber of Commerce.

LOS ANGELES, CAL.—The Fifth Street Building has been organized for the purpose of financing and erecting a twelve-story store building at the corner of Fifth and Broadway at a cost of $1,500,000. Albert C. Martin is the architect. The directors are Clark J. Million, W. M. Pargellis and J. D. McLeod.

LOS ANGELES, CAL.—The Railroad Commission has ordered the California Southern Railroad and the Santa Fe to establish joint rates covering freight shipped between Los Angeles and points in the Palo Verde Valley. The joint rates will mean a cut of approximately 25 per cent on all class rates, and material reduction in commodity rates.

LONG BEACH, CAL.—Edwards, Wildey and Dixon, Black Building, Los Angeles, have been awarded the contract for the new city hall in Long Beach, to cost $337,325. The building will be eight stories and will occupy the site of the present city hall, which will be moved across the street and serve as temporary quarters for the city offices during new building construction.

LOS ANGELES, CAL.—Matters having important bearing on harbor development were considered by the board of directors of the Chamber of Commerce. It was decided to ask for an additional $100,000 for dredging out of the new rivers and to ask for a harbor appropriation of $15,000,000. Although $150,000 has been appropriated for this purpose, it is considered not sufficient.

THE INTERMOUNTAIN DISTRICT

PAYSON, UTAH.—The city council has reduced the rate for sign lighting to 4 cents per kilowatt-hour. This action is taken with a view to increasing the volume of light on Main Street, and to make it less expensive for merchants to use electric signs.

OGDEN, UTAH.—Acting upon the request of Governor Charles R. Mabey, the Ogden Chamber of Commerce has gone on record as favoring the proposed Green River-Utah reservoir project and irrigation proposition, which project will cost in the neighborhood of $2,000,000, according to present plans.

PERRY, UTAH.—At an election held here on April 13th the citizens voted to bond the town in the sum of $6,000 for the purpose of purchasing from the Perry Electric Light Company the electric power line by which electrical energy is distributed in Perry and vicinity. The power is purchased from Brigham City, and as a result of the election the town of Perry will own the distribution system.

BOISE, IDA.—The Utah Power & Light Company has submitted to the Public Utilities Commission of Idaho its inventory and appraisal, with formal application for a valuation by the commission of its Idaho property, in the same manner as the Idaho Power Company has done. The hearing was brief and of a preliminary nature. The inventory carries a physical and intangible value of $21,060,999.

DRAPER, UTAH.—Plans and specifications for the enlargement of the Dry Creek reservoir have been approved by the state engineer. The dam is to be raised from forty to fifty-two feet, increasing the storage capacity of the reservoir to a total of 318,144 acre-feet of water. The reservoir stores water for about 3,000 acres of land in the vicinity of Draper. The addition will admit of more land being put under irrigation, but is more for the purpose of insuring better water service to those already getting water from this source.

BLACKFOOT, IDA.—Contracts have been awarded by the city commission for the construction of a new water system for the city of Blackfoot. The contract price for the new system will represent a plant valued at $300,000. The contract provides for seven miles of cast iron pipe and ten miles of Matheson joint pipe, varying from sixteen to four inches in width. The new system will supply suburbs, now without water, to be pumped from two wells which are to be drilled northwest of the city hall. For emergency, a 100-horsepower semi-Diesel engine will be installed. There will be two 100-horsepower motors, two centrifugal pumps, 100 new fire hydrants of the Corey type, and a steel tank of 100,000-gallon capacity. The pump house will be fireproof.

SALT LAKE CITY, UTAH.—A tunnel for the delivery of water for irrigation from one side of a mountain to the other has just been completed in Sanpete county. The tunnel, which begins on the east slope of the mountain at an altitude of 11,500 feet, penetrates to the western slope a distance of 2,000 feet, and was driven the entire distance through solid rock. The tunnel will be fed by a canal, which will collect the surplus water of Horseshoe flats and will also be supplied from Olson creek and Little's canyon. The water will ultimately be directed to a tract of land lying between Ephraim and Chester, where it is expected to reclaim 3,000 acres of land now unfarmed, and will afford, if desired, a supplemental water supply for 7,000 additional acres, now under cultivation.

OGDEN, UTAH.—Although proposed extensions of the Utah-Idaho Central Railroad from Preston, Idaho, to Grace, Idaho, and possibly to Bancroft, have been urged by citizens of those cities, plans for the extending of the Utah-Idaho Central lines will not be considered until possibly next year, according to officials of the company. A short time ago a committee of citizens of Gentile Valley, Idaho, waited on the officials of the railroad company and petitioned for an extension, but they were informed that no action could be taken at this time due to demands for economy. The plans as outlined, however, are being considered, and it is expected that steps to improve the road and to extend the lines to Grace and Bancroft, and possibly to Pocatello, will be taken in another year.

PRICE, UTAH.—Surveys of the Price irrigation project, embracing complete data as to water allotments, water rights, etc., and the lands which can be placed under irrigation, have been completed by the state engineer's office. The records will now be forwarded to the Carbon county commission preparatory to forming the district and launching the necessary work. The proposed project contemplates the rebuilding of the old Mammoth dam near the headwaters of the Price river, at a cost of from $250,000 to $300,000. This dam was washed out several years ago, causing serious damage in the way of crop failures. As a result of the surveys it has been determined that there are 54,552.7 acres in the project, of which 30,405.6 are suitable for irrigation, the balance being embraced mostly in hills and rough country.

Utopia is getting more and more so. The New York Herald made this one:

"At 6 a.m. the clock will start electric power at work in the suburban home. It will close the bedroom windows, put the draft on the furnace, swing a door which permits the exit of the dog and the entrance of the cat, heat the commuter's shaving and bath water and awaken the commuter with a song, spun from a concealed talking machine, which will cause him to begin his day with a big, cheerful thought.

"At 7 a.m. electricity will take in the milk, make the toast and coffee, boil and even open the eggs, snatch the newspaper from the front steps and polish shoes. Meanwhile, upstairs, the nimble current will have transferred the commuter's buttons from one shirt to another, reminded him on the phonograph to put his spectacles in his pocket and not to forget a handkerchief, and suggested to him that he tell his wife while he is hungry what he would like for dinner. While the commuter is eating breakfast electricity will shake the furnace, let slip some coal through a chute to the fire-pot and suck the ashes from the pipe to the barrel.

"Such are the little ways in which electricity will help mere man as well as super-woman. Even after the commuter has left the house he will hear, before he rounds the corner, the shrill cry of the electrically-timed phonograph on the porch: 'Don't forget to mail my letters.'"

* * *

WHY SHIPS ARE FEMININE

[Some answers, by men, to the question "Why is a ship referred to as 'she'?"]

1. "Because it takes so long to get one ready to go anywhere."
2. "Because it always comes off the ways backwards, like a woman alighting from a street car."
3. "Because it is always calling at some place or other."
4. "Because it is held together with steel."
5. "If you ever tried to steer one you wouldn't ask."

* * *

STATISTICS

A worker in a Chicago packing house claims to have linked together enough frankfurters to reach all the way from Maine to California. And the peanut man at the corner of our block has sold enough peanuts to make Brooklyn Bridge impassable.

If the same depth of snow which fell at Tamarack, California, during a record winter were to fall on the area of New York City, and then suddenly melt, the city would be inundated by sixty-five billion cubic feet of water. If that same snow were piled up on Central Park, the park would be snowbound to a height of about three and one-third miles. And we presume that if it were all piled up on the Woolworth Building, the building would collapse.

* * *

We published it, and so we know that Mr. Kennedy's famous book is very stimulating, but we were not prepared to see the title written "Wining the Public" as it appeared somewhere recently.

* * *

MARKET REPORTS

Burlap displays firmer tone though still quiet. Ultimatum expected.

Butter weak and lower. Still good for frying.

Unsettled conditions in eggs. Almost hatched, in fact.

Butter and eggs sell off fractionally. But half a yolk is better than no egg.

The poor dumb animals are to be let in on the aesthetic pleasures made possible by modern science, judging by a recent item describing the installation of wireless apparatus in a certain concert hall. The apparatus transmitted the program to a point many miles distant "where a large crow was delighted by the singing of Tettrazzini."

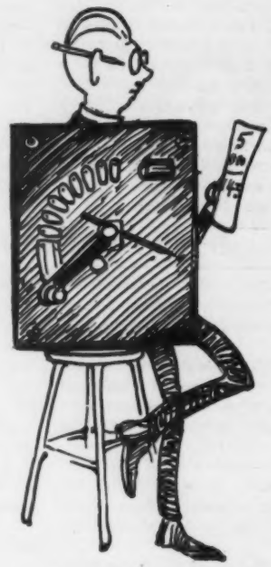
* * *

WHAT'S THE USE?

An editor may scintillate
Until his brain is sore,
But some poor fish is sure to say,
"I've heard that joke before."

* * *

ELECTRICAL HYBRIDS—Series II



2. The Rheostatistician

The Rheostatistician is most accurate and trim;
If you want a perfect balance, take the matter up with him.
He will stop your current business from swamping you, and show
How to keep your power headed in the way it ought to go.

When things are in a muddle he can always smooth them out;
He gives you new resistance, for he knows what he's about.
When equipment breaking down has made expenses run amuck,
He will get things started properly and never pass the buck.